



# DESIGN REFERENCE GUIDE

FOR  
NON-RESIDENTIAL NEW  
CONSTRUCTION (NRNC)  
AND  
RESIDENTIAL NEW  
CONSTRUCTION (RNC)

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# INTRODUCTION

The purpose of the Green Building Index Design Reference Guide is to establish a guidance document to assist project teams in understanding the criteria for each of the main components of the Green Building Index Rating Tool. The project team can use the document as a guide when submitting for the Green Building Index as it clearly identifies examples of how and what is required for completing the submission. Each of the main six criteria's are further divided into the corresponding sub-sections in obtaining the necessary credit points. This guide is indicative and not an exhaustive/definitive reference to the Green Building Index rating tool.

The basic framework of this document sets out for each subsection the intent, description, requirements, approach & implementation and in some occasions calculations to achieve the credit point for each sub-section. The Green Building Index Design Reference Guide further becomes the base curriculum for the training of facilitators on the Green Building Index Rating Tools.

To attain the Green Building Index classification, the procedures are as follows:

<b>STAGE 1</b>	<b>APPLICATION &amp; REGISTRATION</b>
<b>STAGE 2</b>	<b>DESIGN ASSESSMENT</b>
<b>STAGE 3</b>	<b>COMPLETION &amp; VERIFICATION ASSESSMENT</b>

A summary of the stages is described below:

## **STAGE 1 | APPLICATION & REGISTRATION**

Complete and Submit application form with Owner's information, project contact details, project information and any supporting documents to GreenbuildingIndex Sdn Bhd(GSB). Upon acceptance & approval of the application documentation, the registration fee will be confirmed dependent on the size of the project. On payment of fees, a GBI registration number will be given, and the terms and conditions duly signed between owner and GSB. A GBI Certifier will be appointed for the duration of the project.

GBI Registration Fees can be obtained from [www.greenbuildingindex.org](http://www.greenbuildingindex.org)

### **GBI Terms & Conditions**

An agreement setting out the terms and conditions between Project owner and Greenbuildingindex Sdn Bhd to be duly signed at this stage.

## **STAGE 2 | DESIGN ASSESSMENT (DA)**

Appraisal conducted upon the submission by the Project Design team / Client (Architect/Engineer/ Building Owner or Developer directly or through a GBI Facilitator) of comprehensive design and other necessary documents for Green Building Index Assessment. After acceptance of registration from GBI, the Project Design team & client should proceed to collect information for each of the six criteria completing the submittal requirements described under each detailed sub-section. It is recommended that the information submitted is based on preconstruction information (ie tender documentation stage) when all parameters of the design have been finalised. A Provisional Design Assessment certificate is given at this stage. A summary Design Assessment (DA) checklist is provided to determine target scoring.

### STAGE 3 | VERIFICATION & CERTIFICATION ASSESSMENT (VCA)

Appraisal conducted upon CPC of the project when all necessary documents are re-submitted according to as-built information and calculations by the Project Design team / Client (Architect/ Engineer/Building Owner or Developer directly or through a GBI Facilitator).The Completion Assessment confirms that the targeted criteria have been properly implemented and achieved, or otherwise, for the intended classification.

GBI verifies within 12 months of CPC (or CCC whichever is the later); or earlier, if occupancy is not less than 50%, on the project classification. The verification process involves verifying the actual measured energy and water use, sustainable site measures, indoor comfort survey results and action plan, Building Manual and Sustainable Maintenance program. A full Certification is given at this stage. A summary Verification & Certification Assessment (VCA) checklist is provided to determine target scoring.

#### Submission Format

The following is the recommended format of all documents that will form the Design Assessment & Completion & Verification Assessment submission;

1. All Drawings, Plans, Sections and Elevations to be formatted on A3 size paper, with respective scale or scales clearly indicated. Should drawings be too small for legibility, provide a key plan with part plans for full clarity of building information.
2. All Perspectives to fit A3 size paper.
3. All Reports to be A4 format. Signature of Qualified submitting professional should form part of the submission.
4. Clearly mark the Design Assessment Checklist or Completion & Verification Checklist on submission of documentations together with a Design Submission form.

All submission to be saved into CDROM pdf format. Two copies of CDROM are to be submitted to GreenbuildingIndex.

### APPEAL PROCEDURES

Appeal can be submitted (with fee paid) after receiving the Design Assessment result or after receiving the Verification Assessment results.

### VALIDITY OF CERTIFICATION

The validity of the certification is limited for three years. This is to encourage sustainable building maintenance management throughout the life of the building.

### CERTIFIERS & FACILITATORS

GBI Certifiers perform the detailed assessment and accrediting tasks of building projects submitted to the Accreditation panel for GBI Certification.

GBI Facilitator provide services to enable building projects to achieve GBI Accreditation. A GBI Facilitator is a registered person with GSB having completed the training and examinations conducted by GSB.

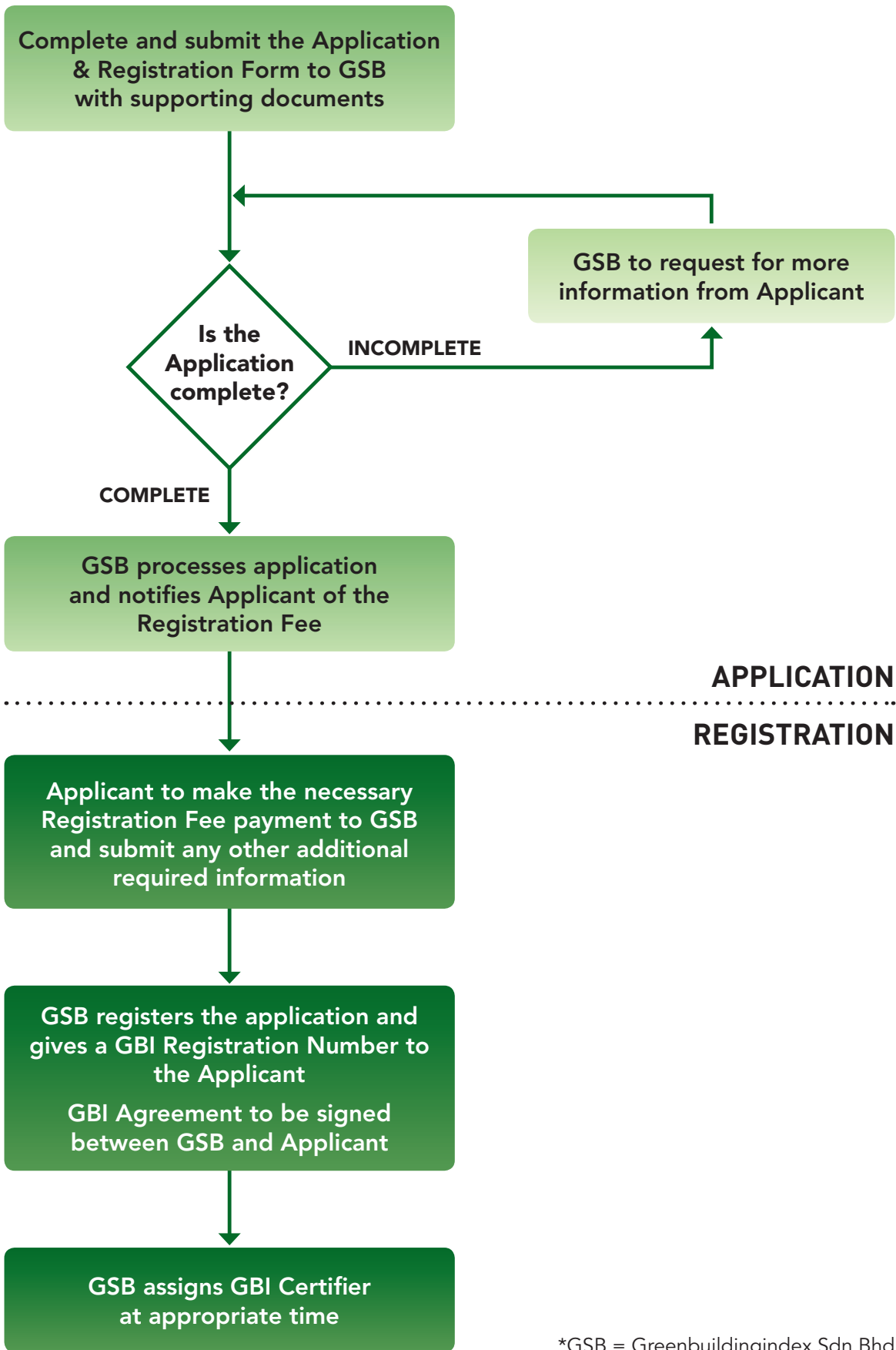
### GBI TERMS & CONDITIONS

An agreement setting out the terms and conditions between the Project owner and GreenbuildingIndex Sdn Bhd.



# **PROCEDURES & SUBMISSION FORMAT**

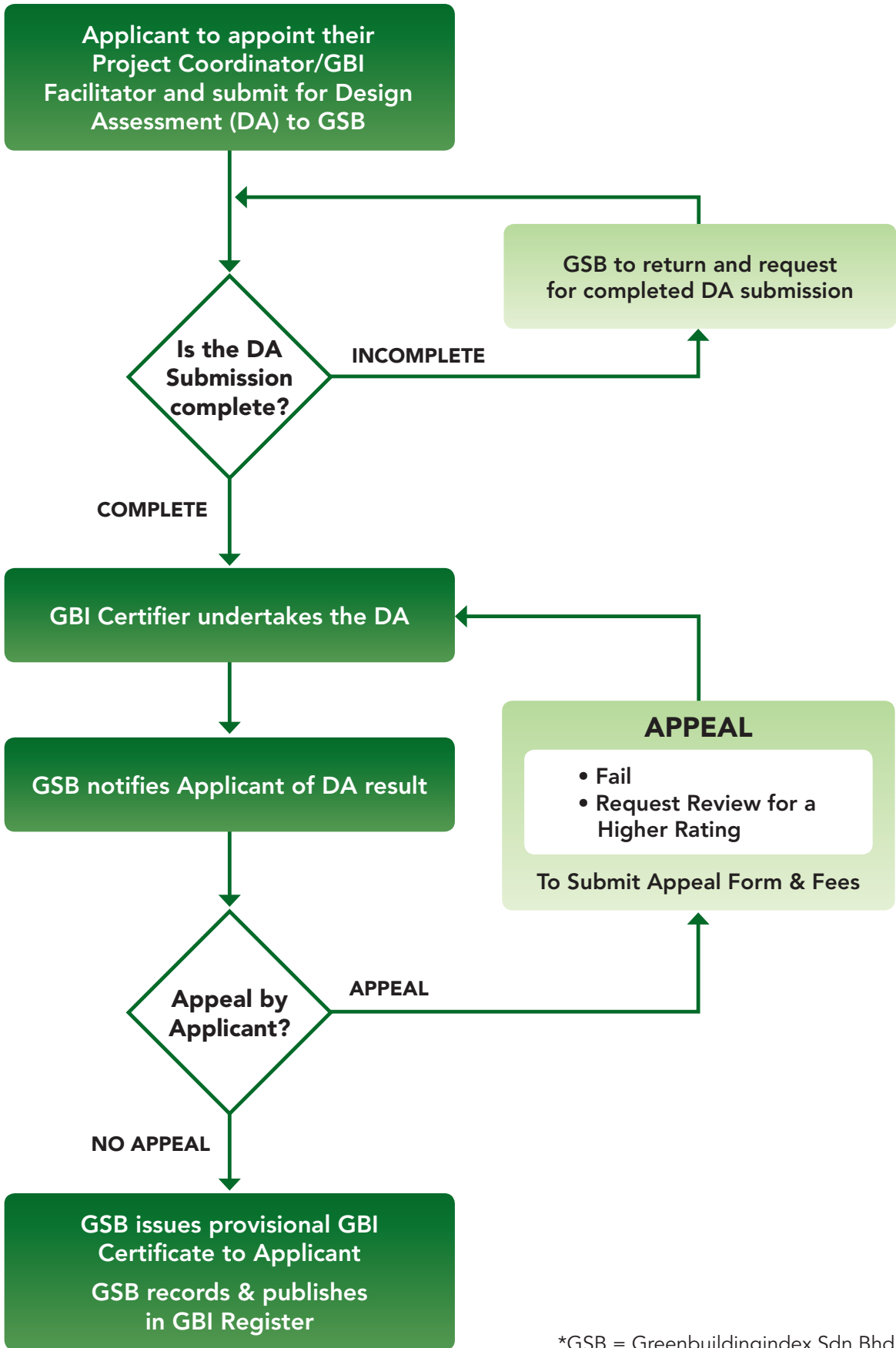
# STAGE 1 APPLICATION & REGISTRATION



**APPLICATION  
REGISTRATION**

\*GSB = Greenbuildingindex Sdn Bhd

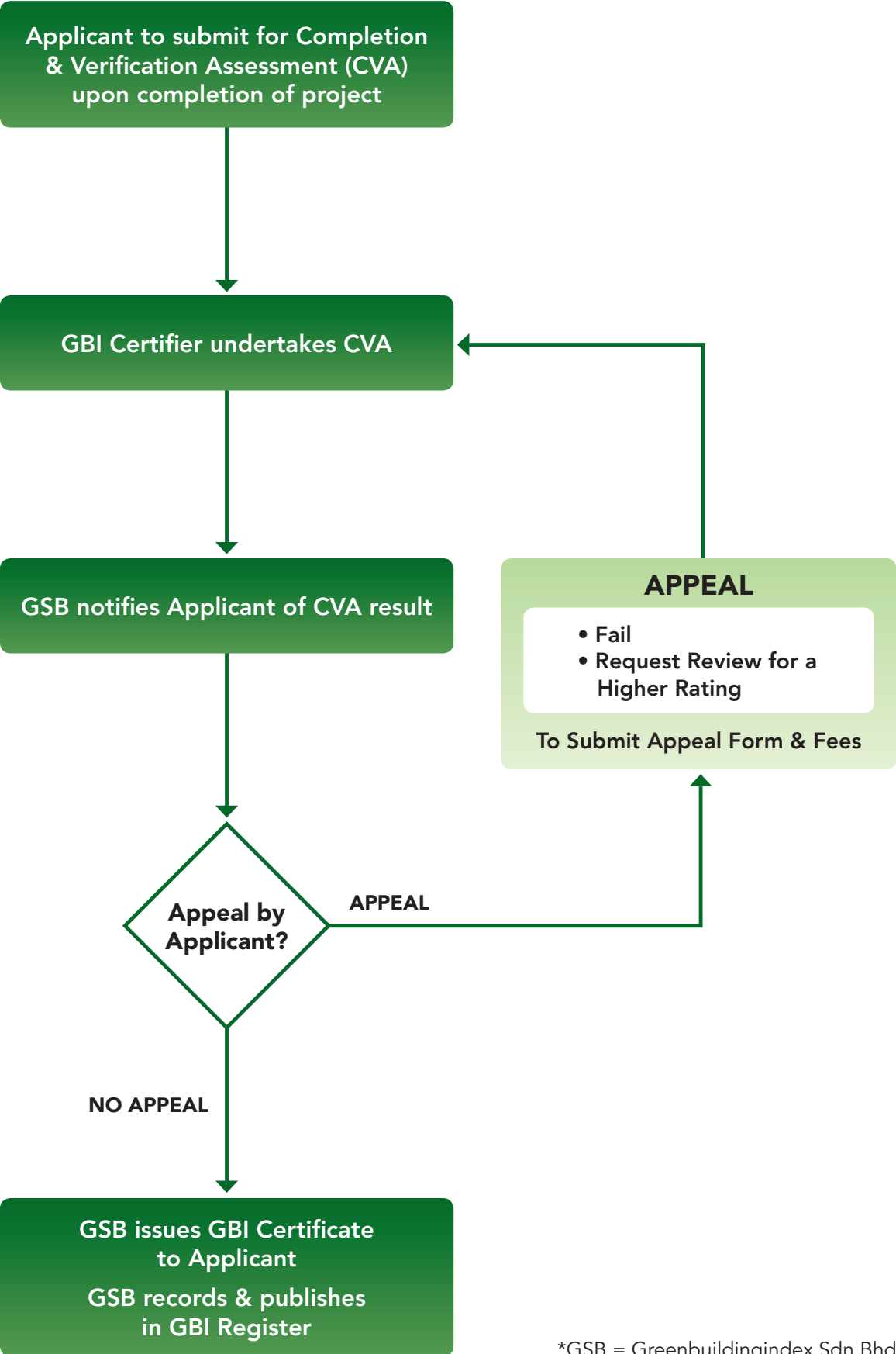
# STAGE 2 DESIGN ASSESSMENT (DA)



\*GSB = Greenbuildingindex Sdn Bhd



## STAGE 3 COMPLETION & VERIFICATION ASSESSMENT (CVA)



\*GSB = Greenbuildingindex Sdn Bhd



**DESIGN REFERENCE GUIDE**  
**PART 1**  
**NON-RESIDENTIAL NEW CONSTRUCTION (NRNC)**

**PART 1 : NON-RESIDENTIAL NEW CONSTRUCTION (NRNC)**

## ASSESSMENT CRITERIA

### OVERALL POINTS SCORE

PART	ITEM	MAXIMUM POINTS	SCORE
1	Energy Efficiency	35	
2	Indoor Environmental Quality	21	
3	Sustainable Site Planning & Management	16	
4	Material & Resources	11	
5	Water Efficiency	10	
6	Innovation	7	
<b>TOTAL SCORE</b>		<b>100</b>	

## GREEN BUILDING INDEX CLASSIFICATION

POINTS	GBI RATING
86+ points	Platinum
76 to 85 points	Gold
66 to 75 points	Silver
50 to 65 points	Certified

The Reference Guide is divided into two parts addressing the two main tools for new construction works. Part 1 covers Non-Residential New Construction Works and Part 2 covers Residential New Construction Works. It is envisaged that this reference guide is a live document that from time to time will be updated for the benefit of the end users.

### **PART 1 : NON-RESIDENTIAL NEW CONSTRUCTION (NRNC)**

#### **1.1 ENERGY EFFICIENCY (EE)**

1.1.1.	EE1	: Minimum EE Performance
1.1.2	EE2	: Lighting Zone
1.1.3	EE3	: Electrical Sub-metering
1.1.4	EE4	: Renewable Energy
1.1.5	EE5	: Advanced EE Performance – BEI
1.1.6	EE6	: Enhanced Commissioning
1.1.7	EE7	: Post Occupancy Commissioning
1.1.8	EE8	: EE Verification
1.1.9	EE9	: Sustainable Maintenance

#### **1.2 INDOOR ENVIRONMENTAL QUALITY (EQ)**

1.2.1	EQ1	: Minimum IAQ Performance
1.2.2	EQ2	: Environmental Tobacco Smoke (ETS) Control
1.2.3	EQ3	: Carbon Dioxide Monitoring and Control
1.2.4	EQ4	: Indoor Air Pollutants
1.2.5	EQ5	: Mould Prevention
1.2.6	EQ6	: Thermal Comfort: Design & Controllability of Systems
1.2.7	EQ7	: Air Change Effectiveness
1.2.8	EQ8	: Daylighting
1.2.9	EQ9	: Daylight Glare Control
1.2.10	EQ10	: Electric Lighting Levels
1.2.11	EQ11	: High Frequency Ballasts
1.2.12	EQ12	: External Views
1.2.13	EQ13	: Internal Noise Levels
1.2.14	EQ14	: IAQ Before & During Occupancy

#### **1.3 SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)**

1.3.1	SM1	: Site Selection
1.3.2	SM2	: Brownfield Redevelopment
1.3.3	SM3	: Development Density & Community Connectivity
1.3.4	SM4	: Environmental Management
1.3.5	SM5	: Earthworks - Construction Activity Pollution Control
1.3.6	SM6	: QLASSIC
1.3.7	SM7	: Workers' Site Amenities
1.3.8	SM8	: Public Transportation Access
1.3.9	SM9	: Green Vehicle Priority
1.3.10	SM10	: Parking Capacity
1.3.11	SM11	: Stormwater Design – Quantity & Quality Control
1.3.12	SM12	: Greenery & Roof
1.3.13	SM13	: Building User Manual

**1.4 MATERIALS & RESOURCES (MR)**

- 1.4.1 MR1 : Materials Reuse and Selection
- 1.4.2 MR2 : Recycled Content Materials
- 1.4.3 MR3 : Regional Materials
- 1.4.4 MR4 : Sustainable Timber
- 1.4.5 MR5 : Storage & Collection of Recyclables
- 1.4.6 MR6 : Construction Waste Management
- 1.4.7 MR7 : Refrigerants & Clean Agents

**1.5 WATER EFFICIENCY (WE)**

- 1.5.1 WE1 : Rainwater Harvesting
- 1.5.2 WE2 : Water Recycling
- 1.5.3 WE3 : Water Efficient Landscaping
- 1.5.4 WE4 : Water Efficient Fittings
- 1.5.5 WE5 : Metering & Leak Detection System

**1.6 INNOVATION (IN)**

- 1.6.1 IN1 : Innovation in Design & Environmental Design Initiatives
- 1.6.2 IN2 : Green Building Index Accredited Facilitator

PART 1 | NON-RESIDENTIAL | ENERGY EFFICIENCY (EE)

**EE**  
**ENERGY EFFICIENCY**

## PART 1 | NON-RESIDENTIAL | ENERGY EFFICIENCY (EE)

**EE1****MINIMUM EE PERFORMANCE****1 POINT****INTENT**

Create EE awareness, promote the use of MS 1525 and to provide a thermally comfortable environment to reduce the use of air-conditioning in non residential buildings, thereby reducing CO<sub>2</sub> emission.

**DESCRIPTION**

Establish minimum energy efficiency (EE) performance to reduce energy consumption in buildings, thus reducing CO<sub>2</sub> emission to the atmosphere. Meet the following minimum EE requirements as stipulated in MS 1525:2007.

**REQUIREMENTS**

1. OTTV  $\leq$  50, RTTV  $\leq$  25. Submit calculations using the BEIT software or other GBI approved software/s, **AND**
2. Provision of Energy Management Control System where Air Conditioned space  $\geq$  4000m<sup>2</sup>

**APPROACH & IMPLEMENTATION**

Wall insulation can be achieved in many ways, such as, but not limited to, using autoclaved lightweight concretes, composite insulated walls, double brickwall and many other construction systems. Glazing should be optimally sized. The use of Insulated Glazing Units and/or performance glazing such as low-e and/or spectrally selective glazing is encouraged as these can help lower the OTTV significantly. Roof should be insulated with suitable insulation materials to prevent heat gain into occupied spaces below.

**POTENTIAL TECHNOLOGIES & STRATEGIES**

Design the building envelope, HVAC, lighting and other systems to maximize energy performance.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Plans and elevations marking out walls & apertures used for the calculation, coloured blue; and walls & apertures not used for calculation, coloured red. Recommended scale 1: 200.
2. Calculations for each wall orientation.
3. Description of wall & aperture materials specified.
4. Calculations of U-values for roof and walls.
5. Proposed Glazing specifications on Shading Coefficient, U-value and Visible Light Transmission.
6. Confirm provision of energy management control system where air conditioned space  $\geq$  4000m<sup>2</sup>.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built plans and elevations marking out walls & apertures used for the calculation, coloured blue; and walls & apertures not used for calculation, coloured red.
2. Calculations for each wall orientation.
3. Description of built wall & aperture materials with U-value calculation
4. Manufacturer issued glazing specification on shading coefficient, U-values and Visible Light Transmission.
5. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | ENERGY EFFICIENCY (EE)

**EE2****LIGHTING ZONING****3 POINTS****INTENT**

Provide flexible lighting controls to optimise energy savings.

**DESCRIPTION**

Encourage and recognise lighting design practices that offer greater flexibility for light switching, making it easier to light only occupied areas.

**REQUIREMENTS**

1. One (1) point: Awarded for all individual or enclosed spaces that are individually switched; and the size of individually switched lighting zones shall not exceed 100m<sup>2</sup> for 90% of the NLA; with switching clearly labelled and easily accessible by building occupants.
2. One (1) point: Awarded for provision of auto-sensor controlled lighting in conjunction with daylighting strategy for all perimeter zones and daylit areas, if any.
3. One (1) point: Awarded for provision of motion sensors or equivalent to complement lighting zoning for at least 25% NLA.

**APPROACH & IMPLEMENTATION**

Limiting the size of lighting zones allows for more flexible control over lighting giving owners/tenants the ability to reduce energy consumption and costs by only lighting those areas or zones that are occupied or required.

**POTENTIAL TECHNOLOGIES & STRATEGIES**

Design lighting zones by increasing switching flexibility with controls by individual switches and/or automated sensing devices.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Drawings of floor plans clearly showing every proposed individually switched lighting zone and its coverage area, in m<sup>2</sup>.
2. Electrical schematic drawings showing the locations and extent of switching, the area controlled by the switch and automated control sensing system detailed.
3. Documented report of all switched zones to demonstrate that the total areas meet the percentage NLA requirements.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As Built Drawings of floor plans clearly showing each individually switched lighting zone and its coverage area, in m<sup>2</sup>.
2. As Built Electrical schematic drawings showing the locations and extent of switching, the area controlled by the switch and automated control sensing system detailed.
3. Documented report of all switched zones and confirmation that the total area meets the percentage NLA requirements.
4. Photographic evidence of typical auto-sensor and motion sensor installation.
5. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT



## PART 1 | NON-RESIDENTIAL | ENERGY EFFICIENCY (EE)

EE3

**ELECTRICAL SUB-METERING &  
TENANTS SUB-METERING**

1 POINT

**INTENT**

Monitor energy consumption of key building services as well as all tenancy areas.

**DESCRIPTION**

1. Encourage and recognise the provision of energy sub-metering to facilitate energy monitoring of base building services.
2. Encourage and recognise the provision of energy sub-metering to facilitate energy monitoring by tenants or end users

**REQUIREMENTS**

Provide sub-metering where energy use  $\geq 100\text{kVA}$ ; with separate sub-metering each for lighting and for power at each floor or tenancy, whichever is smaller.

**APPROACH & IMPLEMENTATION**

For a typical building, separate metering shall be provided for car park; chiller; AHU; lift; common area lighting and power and any additional item which carries an energy use  $\geq 100\text{kVA}$ .

For a speculative building, compliance can be achieved by demonstrating commitment and provision to install meters for separate tenancy areas. As a minimum this is to be provided on each floor and to each wing or other clearly separable tenancy area or zone.

Where Energy Management System (EMS) is provided, all meters should be linked to the EMS for monitoring and recording, and control where appropriate.

**POTENTIAL TECHNOLOGIES & STRATEGIES**

Use the Energy Management System (EMS) for measurement and management of energy usage including Maximum Demand Limiting.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. An extract from the specification detailing the installation requirements for electrical sub-meters that meets the credit criteria.
2. Clearly marked electrical schematic drawings showing the proposed locations of meters and the usage served by those meters.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built electrical schematic drawings showing the exact locations of meters and the usage served by those meters.
2. Photographic evidence of sub-metering installation for each typical energy use.
3. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | ENERGY EFFICIENCY (EE)

EE4

RENEWABLE ENERGY

5 POINTS

**INTENT**

Promote the use of all forms of renewable energy so as to reduce environmental impact due to emission of CO<sub>2</sub>.

**DESCRIPTION**

The use of renewable energy systems will serve to reduce the need for power plant-up and promote green energy use. Calculate the project performance by expressing the energy produced by the renewable energy systems as a percentage of the building annual energy use. In the context of the built environment in Malaysia, the most likely form of renewable energy would be derived from BIPV. Other forms of renewable energy are also applicable with their appropriate conversion into equivalent electrical energy for calculation purposes.

**REQUIREMENTS**

1. **2 (Two) points** : Awarded where 0.5 % (of total) or 5 kWp (of BIPV) whichever is the greater, of the total electricity consumption is generated by renewable energy, **OR**
2. **3 (Three) points** : Awarded where 1.0 % or 10 kWp whichever is the greater, of the total electricity consumption is generated by renewable energy, **OR**
3. **4 (Four) points** : Awarded where 1.5 % or 20 kWp whichever is the greater, of the total electricity consumption is generated by renewable energy, **OR**
4. **5 (Five) points** : Awarded where 2.0 % or 40 kWp whichever is the greater, of the total electricity consumption is generated by renewable energy.

**Note:** Electricity consumption includes other form of energy generation.

**APPROACH & IMPLEMENTATION**

Assess the project for renewable energy potential including solar, wind, geothermal, low-impact hydro, biomass and other non-polluting technologies. Building Integrated Photo Voltaics (BIPV) is highly recommended to be used to generate renewable electricity in non residential buildings in the Malaysian climate. The BIPV system can be grid connected or stand-alone system with battery pack to store excess energy production.

**POTENTIAL TECHNOLOGIES & STRATEGIES**

Assess the project for non-polluting and renewable energy potential including solar, wind, geothermal, low-impact hydro, biomass and bio-gas strategies. When applying these strategies, take advantage of grid connectivity with the local utility.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Plans and elevations marking out areas allocated to house renewable energy equipment.
2. Describe the proposed technology to be used, including documenting total kWp or predicted equivalent energy in kWh.
3. Show predicted total electricity consumption by the building and percentage of renewable energy to be generated.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built plans and elevations marking out location of renewable energy (RE) equipment.
2. Manufacturer's technical specification of the renewable energy equipment.
3. Photographic evidence of the RE installation.
4. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | ENERGY EFFICIENCY (EE)

**EE5****ADVANCED EE PERFORMANCE****15 POINTS****INTENT**

Encourage enhancement of building EE performance in conjunction with providing a thermally comfortable environment and reducing the use or need for air-conditioning, thereby reducing CO<sub>2</sub> emission.

**REQUIREMENTS**

Up to 15 points are awarded where it is demonstrated that Energy Efficiency (EE) performance exceeds the baseline minimum to reduce energy consumption in the building. Achieve Building Energy Intensity (BEI) as defined under GBI reference (using BEIT Software or other GBI approved software/s), for award of points as follows:

1.	2 points	=	BEI < 150 kWh/m <sup>2</sup> /year
2.	3 points	=	BEI < 140 kWh/m <sup>2</sup> /year
3.	5 points	=	BEI < 130 kWh/m <sup>2</sup> /year
4.	8 points	=	BEI < 120 kWh/m <sup>2</sup> /year
5.	10 points	=	BEI < 110 kWh/m <sup>2</sup> /year
6.	12 points	=	BEI < 100 kWh/m <sup>2</sup> /year
7.	15 points	=	BEI < 90 kWh/m <sup>2</sup> /year

**Note:** BEI values given above are applicable to Office Buildings. Refer to GBIAP for BEI values for other categories of Non-Residential Buildings.

**APPROACH & IMPLEMENTATION**

Cutting edge technologies and materials should be fully explored for application. For passive design applications, consider wall insulation, such as using autoclaved lightweight concrete, composite insulated wall, double brickwall or other options. Glazing should be optimally sized and the use of Insulated Glazing Units and/or performance glazing such as low-e and/or spectrally selective glazing is encouraged. Roof insulation should also be properly addressed. For active design applications, consider EE products for all components and educate users on need to reduce plug loads both in procurement policy and usage.

**POTENTIAL TECHNOLOGIES & STRATEGIES**

Design the building envelope and systems to maximize energy performance. Adopt the most energy efficient design concepts and strategies. Quantify BEI performance as compared to a baseline building with the aid of appropriate simulation software tools.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Submit predicted BEI calculations. (For GBI Certified or Silver rating, may use static energy calculation using manual method or software programs such as BEIT or other GBI approved software programs; for GBI Gold or Platinum, must use dynamic energy calculation using GBI approved software programs)

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Actual verified BEI achieved for completed building together with supporting EMS documentation.
2. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | ENERGY EFFICIENCY (EE)

**EE6****ENHANCED COMMISSIONING OF BUILDING ENERGY SYSTEMS****3 POINTS****INTENT**

Ensure building's energy related system are designed and installed to achieve proper commissioning so as to realise their full potential and intent. This will serve to eliminate the bad practice of not fully commissioning the installed systems upon occupation.

**REQUIREMENTS**

Three (3) points are awarded to ensure building's energy related systems are designed and installed to achieve proper commissioning so as to realise their full potential and intent. Appoint an independent GBI recognised Commissioning Specialist (CxS) at the onset of the design process to verify that comprehensive pre-commissioning and commissioning is performed for all the building's energy related systems in accordance with ASHRAE Commissioning Guideline or other GBI approved equivalent standard/s by:

1. Conducting at least one commissioning design review during the detailed design stage and back-check the review comments during the tender documentation stage.
2. Developing and incorporating commissioning requirements into the tender documents.
3. Developing and implementing a commissioning plan.
4. Verifying the installation and performance of the systems to be commissioned.
5. Reviewing contractor submittals applicable to systems being commissioned for compliance.
6. Developing a systems manual that provides information for future operating staff to understand and operate the commissioned systems optimally.
7. Verifying the requirements for training operating personnel and building occupants are completed.

**APPROACH & IMPLEMENTATION**

Appoint a CxS from design through to handover stage. CxS to provide commissioning advice to the Client and the design team and to monitor and verify commissioning of the building's energy related systems.

**POTENTIAL TECHNOLOGIES & STRATEGIES**

Installation of state-of-the-art measuring devices and sensors that will aid in commissioning and also enhance EE.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Confirmation letter from the CxS of his appointment and scope of works in accordance with the GBI CxS requirements.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Documentary evidence that the full scope of CxS works have been carried out during the contract administration phase.
2. The final commissioning report including recommendations to the client regarding the performance of the commissioned building energy related systems.
3. A copy of the systems manual as described in the CxS scope of works.
4. Documented evidence of training of building management staff.
5. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 1 | NON-RESIDENTIAL | ENERGY EFFICIENCY (EE)**

<b>EE7</b>	<b>POST OCCUPANCY COMMISSIONING</b>	<b>2 POINTS</b>
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**INTENT**

Ensure proper design and commissioning are carried out during and after fit-out's (if any) so that the intended EE and IEQ are fully sustained.

**REQUIREMENTS**

1. One (1) point: Awarded where design engineer reviews all tenancy fit-out plans to ensure original design intent is not compromised and upon completion of the fit-out works, verify and fine-tune the installations to suit.
2. One(1) point: Awarded where within 12 months of practical completion (or earlier if there is at least 50% occupancy), the CxS carries out a full post/re-commissioning of the building's energy related systems to verify that their performance is sustained in conjunction with the completed tenancy fit-outs.

**APPROACH & IMPLEMENTATION**

Design engineers must check all fit-out designs. The CxS shall carry out the post occupancy commissioning for all tenancy areas after fit-out changes are completed.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

Declaration that post occupancy commissioning will be undertaken.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Document what has been approved and constructed for post-occupancy fit-out's.
2. CxS to verify recommissioning of post occupancy fit out's.
3. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | ENERGY EFFICIENCY (EE)

**EE8****EE VERIFICATION****2 POINTS****INTENT**

Provide for the ongoing accountability of building energy consumption over time.

**REQUIREMENTS**

1. Two (2) points: Awarded for the use of Energy Management System to monitor and analyse energy consumption including reading of sub-meters, **AND**  
Fully commission EMS including Maximum Demand Limiting programme within 12 months of practical completion (or earlier if there is at least 50% occupancy).

**APPROACH & IMPLEMENTATION**

Fully commission the maximum demand limiting programme and utilise EMS to monitor energy consumption.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

Declaration of commitment to carry out EE verification upon completion.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Actual verified BEI achieved for completed building.
2. Where EMS is installed, comprehensive printouts of EMS results.
3. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | ENERGY EFFICIENCY (EE)

EE9

SUSTAINABLE MAINTENANCE

3 POINTS

**INTENT**

Ensure the building's energy related systems will continue to perform as intended beyond the 12 months Defects & Liability Period.

**REQUIREMENTS**

1. One (1) point : Awarded where at least 50% of permanent building maintenance team is on-board one (1) to three (3) months before practical completion and fully participate (to be specified in contract conditions) in the Testing & Commissioning of all building energy related systems.
2. Two (2) Points : Awarded for providing a designated building maintenance office that is fully equipped with facilities (including tools and instrumentation) and inventory storage **AND**

Provision of evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget (inclusive of staffing and outsourced contracts).

**APPROACH & IMPLEMENTATION**

Ensure the maintenance team fully participates in the testing and commissioning stage, understand the design intent and provide a 3 year sustainable maintenance program.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Identify building maintenance room and facilities in the design floor plans.
2. Commitment to engage at least 50% of permanent building maintenance team before practical completion with proposed positions identified.
3. Commitment to provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget (inclusive of staffing and outsourced contracts).

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Documentary evidence of engagement of 50% of the maintenance team one to three months before practical completion who are then involved in the full testing & commissioning of the building energy related systems.
2. Comprehensive list of maintenance tools and instrumentation, and inventory storage items including photographic evidence.
3. Provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget for facility maintenance (inclusive of staffing and outsourced contracts).
4. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 1 | NON-RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)**

**EQ**  
**INDOOR ENVIRONMENTAL  
QUALITY**



## PART 1 | NON-RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)

**EQ1****MINIMUM IAQ PERFORMANCE****1 POINT****INTENT**

Provide minimum IAQ performance in buildings to ensure the comfort and well-being of building occupants

**DESCRIPTION**

Meet the minimum requirements of ventilation rate in ASHRAE 62.1:2007 or the local building code, whichever is the more stringent.

**REQUIREMENTS**

Meet the minimum requirements specified in ASHRAE 62.1-2007 or local building code whichever is stricter.

**APPROACH & IMPLEMENTATION**

Designing building ventilation system to meet the minimum requirement specified in ASHRAE 62.1-2007 ensures adequate fresh air is available to occupants in the space. The Ventilation Rate Procedure or the Indoor Air Quality Procedures can be used to determine the minimum required ventilation rates for various applications. Ventilation Rate Procedure is more straight-forward to apply. The IAQ Procedure of Standard 62.1 is a performance-based procedure that addresses designing the ventilation system to maintain acceptable levels of known contaminants.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Description of the project ventilation design.
2. Schematic to illustrate the project ventilation system design.
3. Summary table with calculations to illustrate how the delivered minimum outdoor airflow to each zone and the outdoor air intake for the system meet the requirements of ASHRAE or local code.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built drawings to illustrate the project ventilation system design.
2. Summary report to describe the ventilation design and how it complies with ASHRAE 62.1 including information regarding the fresh air intake volumes and any special conditions that affect the project ventilation design.
3. Detailed calculations or simulations to show how the delivered minimum outdoor airflow to each zone and outdoor airflow air intake for the system meet the requirements in ASHRAE or local code.
4. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ2

ENVIRONMENTAL TOBACCO  
SMOKE (ETS) CONTROL

1 POINT

**INTENT**

Minimize exposure of building occupants to Environmental Tobacco Smoke.

**DESCRIPTION**

Avoid health problems associated with tobacco smoke by preventing possible contamination in the building, thereby reducing health risks to occupants linked to "secondhand smoke".

**REQUIREMENTS**

1. Enforce prohibition of smoking in buildings, **AND**
2. Locate any exterior designated smoking areas at least 10m away from entries, outdoor air intakes and operable windows.

**APPROACH & IMPLEMENTATION**

Prohibition of smoking in air-conditioned public building is already mandatory under Malaysian Law. This credit can be achieved by strictly enforcing prohibition of smoking in the building, through supervision or signage. If designated smoking areas are provided outside the building, ensure that the tobacco smoke does not enter the building or the ventilation system.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Description of strategies to be employed in the building to achieve this credit (by means of management policy or signage proposal).
2. Plans showing the location of exterior designated smoking areas, if any.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built drawings identifying location of exterior designated smoking areas.
2. Summary report describing strategies undertaken to ensure prohibition of smoking indoors can be enforced and strategies implemented to ensure that tobacco smoke will not enter the building or ventilation system where exterior smoking area is provided.
3. Photographic evidence of strategies adopted.
4. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ3

**CARBON DIOXIDE MONITORING  
AND CONTROL**

1 POINT

**INTENT**

Provide capacity for effective ventilation system monitoring and control to ensure the comfort and well-being of building occupants.

**DESCRIPTION**

Use carbon dioxide monitoring and control system to deliver the required outdoor air to the occupants to suit variation in occupancy.

**REQUIREMENTS**

1. Install carbon dioxide (CO<sub>2</sub>) monitoring and control system with at least one (1) CO<sub>2</sub> sensor at main return points on each floor to facilitate continuous monitoring and adjustment of outside air ventilation rates to each floor, and ensure independent control of ventilation rates to maintain CO<sub>2</sub> level < 1,000 ppm.

**APPROACH & IMPLEMENTATION**

Use of carbon dioxide monitoring system is a typical energy conservation measure to ensure different spaces receive adequate outdoor air for their current occupancy and the ventilation system can adjust the ventilation rate to meet changing requirements. This helps ensure occupants will receive adequate outdoor air at all times.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Submission of ventilation and control schematics together with description of how CO<sub>2</sub> monitoring and controls are integrated into the ventilation design.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built drawings showing the installed sensors and controls.
2. Summary report on the ventilation design and CO<sub>2</sub> monitoring and control system including information regarding the location, quantity of installed controls, the operational parameters and setpoints.
3. Manufacturer's information confirming the specifications of the CO<sub>2</sub> sensors.
4. Photographic evidence of typical installations.
5. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)

**EQ4****INDOOR AIR POLLUTANTS****2 POINTS****INTENT**

Minimize detrimental impact on occupant health through the use of materials with minimal volatile organic compounds (VOC) and formaldehyde content.

**DESCRIPTION**

Encourage the use and specification of healthy materials and finishes which contain low volatile organic compounds (VOC) and formaldehyde.

**REQUIREMENTS****1 point for:**

1. Use low VOC paint and coating throughout the building. Paints and Coatings to comply with requirements specified in international labelling schemes recognized by GBI, **AND**
2. Use low VOC carpet or flooring throughout the building. Carpets to comply with requirements specified in international labelling schemes recognized by GBI. Other types of flooring to comply with requirements under FloorScore developed by Science Certification System or equivalent, **AND**  
Use low VOC adhesive and sealant or no adhesive or sealant used. Adhesives and sealants to comply with requirements specified in international labelling schemes recognized by GBI.

**1 point for:**

Use products with no added urea formaldehyde. These include:

1. Composite wood and agrifiber products defined as: particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates and door cores, **AND**
2. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies, **AND**
3. Insulation foam, **AND**
4. Draperies

**APPROACH & IMPLEMENTATION**

The credit requirements should be clearly stated in project specifications. Provide cut-sheets, material safety data sheets, certificates and test reports. Submittal of the compliance documentation is a pre-requisite for product approval.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Summary report identifying areas where the low VOC materials will be installed and how the credit compliance is to be met.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built drawings showing where low VOC materials or products are used.
2. List of products installed that meet the credit requirements, and their specifications.
3. Manufacturer's information including data sheets, certificates, test reports etc to demonstrate credit compliance.
4. Photographic evidence of each typical low VOC installation.
5. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ5

MOULD PREVENTION

1 POINT

**INTENT**

Prevent microbial contamination in the building to ensure the health and well-being of building occupants.

**DESCRIPTION**

Design systems which reduce the risk of mould growth and its associated detrimental impact on occupant health.

**REQUIREMENTS**

Demonstrate that the air-conditioning and mechanical ventilation system will maintain a positive indoor air pressure relative to the exterior, and can actively control indoor air humidity to be no more than 70% RH without the use of primary active reheat system (which consumes additional energy).

Ensure that excessive moisture in building is taken into consideration during design, and be controlled and monitored during construction and operation stages by control of the following:

1. Rainwater leakage through roof and walls
2. Infiltration of moist air
3. Diffusion of moisture through walls, roof and floors
4. Groundwater intrusion into basements and crawl spaces through walls and floors
5. Leaking or burst pipes
6. Indoor moisture sources
7. Construction moisture

**OR**

The above mentioned measures are not necessary or applicable if the building is fully naturally ventilated.

**APPROACH & IMPLEMENTATION**

The most effective way to control indoor mould growth is through elimination of moisture. It is important to dry water damaged areas and items within 24 to 48 hours to prevent mould growth. Humidity in spaces and ductwork has to be controlled throughout construction and occupation of the building.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Summary report outlining the strategies adopted to meet the credit requirements.
2. A copy of specifications for the strategies to be carried out.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built drawings or as built specifications confirming that the building has been constructed in accordance with the design stage drawings/specifications.
2. Manufacturer's information on all relevant materials specified for mould prevention and/or resistance, to verify credit compliance
3. Documentation evidence during construction of the precautions taken for mould prevention, e.g. photographs of material storage and protection for items that are susceptible to mould growth as identified in the DA submission stage.
4. Provide 24-hour record (during full occupancy) of Temperature-Relative Humidity measurements for at least two (2) areas as agreed with the GBI Certifier.
5. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)

**EQ6****THERMAL COMFORT: DESIGN & CONTROLLABILITY OF SYSTEMS****2 POINTS****INTENT**

Provide a thermal environment that is comfortable and supports the productivity and well-being of building occupants.

**DESCRIPTION**

Provide a high level of thermal comfort system control by individual occupants or by specific groups in multi-occupant spaces to promote the productivity, comfort and well-being of building occupants.

**REQUIREMENTS**

1. Design to ASHRAE 55 standards in conjunction with the relevant localised parameters as listed in MS 1525:2007
2. Provide individual comfort control for > 50% of the building occupants to enable adjustments to suit individual task needs and preferences.

**AND**

Provide comfort system control for all shared multi-occupant spaces to enable adjustments to suit group needs and preferences.

**APPROACH & IMPLEMENTATION**

Conditions for thermal comfort include the primary factors of air temperature, radiant temperature, air speed and humidity. Comfort system control for this purpose is defined as the provision of control over at least one of these primary factors in the occupants' local environment.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Summary report of the strategies that the project will undertake to fulfill the requirements specified in ASHRAE 55 in conjunction with the relevant localised parameters as listed in MS 1525:2007
2. Describe how the project will fulfill the requirements on provision of individual control at least 50% of building occupants and also provision of controls for shared multi-occupant spaces.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Summary report that includes information on the methods used to establish thermal conditions for the project and how the system design addresses the design criteria.
2. Provide 72-hour record (during full occupancy) of temperature measurement for at least two (2) areas as agreed with the GBI Certifier, to verify the specified close thermal comfort condition.
3. Summary report on the individual types of control and the controls for multi-occupant spaces that are provided to achieve the credit compliance.
4. Photographic evidence of each typical type of sensor and control installed.
5. Describe any deviation or addition to the DA submission

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)

**EQ7****AIR-CHANGE EFFECTIVENESS****1 POINT****INTENT**

Ensure clean air is delivered effectively through reduced mixing of indoor pollutants to achieve a good indoor environment.

**DESCRIPTION**

Prevent or minimize short-circuiting of recirculating supply and return air.

**REQUIREMENTS**

1. Demonstrate that the Air Change Effectiveness (ACE) meets the following criteria for at least 90% of the NLA:

The ventilation system is designed to achieve an  $ACE \geq 0.95$  when measured in accordance with ASHRAE 129 -1997. Measure air change effectiveness, where ACE is to be measured within the breathing zone (nominally 1.0 m from finished floor level).

**APPROACH & IMPLEMENTATION**

Compliance may be met either through measurement of the completed building in accordance to ASHRAE 129 or equivalent or using CFD simulations.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Summary report detailing the design criteria that has been adopted for each type of space in the development.
2. Describe how the ventilation system is designed to meet the credit compliance.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built drawings to show the ventilation system.
2. Summary report detailing the ventilation design criteria adopted for each type of space in the building.
3. Record of measurement to demonstrate compliance of this credit requirement.
4. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ8

DAYLIGHTING

2 POINTS

**INTENT**

Encourage use of diffused daylighting into interior of building.

**DESCRIPTION**

Design and implement good level of diffused daylight into interior of building.

**REQUIREMENTS**

1. Demonstrate that  $\geq 30\%$  of the NLA has a Daylight Factor in the range of 1.0 – 3.5% as measured at the working plane, 800mm from floor level (1 point), **OR**
2. Demonstrate that  $\geq 50\%$  of the NLA has a Daylight Factor in the range of 1.0 – 3.5% as measured at the working plane, 800mm from floor level (2 points).

**Note:** Refer to MS1525:2007 for the description and calculation of Daylight Factor.

**APPROACH & IMPLEMENTATION**

Daylight system for building includes window, façade shading/light deflecting devices (e.g. lightshelves), roof lights and atrium spaces. The daylight factor is the ratio of indoor light level measured on the working plane to the outdoor light level during overcast conditions with no direct sun. For a daylit space, to ensure visual comfort, the lighting level should be fairly uniform with no great contrast.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

Summary report with diagrams, of the design daylight strategies including for glare control that will be undertaken to meet the credit requirements.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built drawings and specifications demonstrating that the daylighting system has been constructed according to design drawings/specifications.
2. Typical floor plans with Daylight Factor measurement results.
3. Site plan incorporating height of existing buildings or planned buildings surrounding the building together with solar diagrams & sunpath.
4. Summary of Daylight Factor results.
5. Manufacturer's Information on the daylighting system used, if custom-made.
6. Furnish photographs of each type of typical device installed.
7. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT



## PART 1 | NON-RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)

**EQ9****DAYLIGHT GLARE CONTROL****1 POINT****INTENT**

Reduce discomfort of glare from natural light.

**DESCRIPTION**

Ensure daylighting system is designed with adequate and proper glare control in order not to negate the benefits of daylighting.

**REQUIREMENTS**

Reduce discomfort of glare from natural light. Where blinds or screens are fitted on glazing and atrium as a base building, incorporate provisions to meet the following criteria;

1. Eliminate glare from all direct sun penetration and keep horizontal workspace luminance level below 2000 lux;
2. Eliminate glare from diffused sky radiation for occupant workspace at viewing angles of 15° to 60° from the horizontal at eye level (typically 1.2m from floor level);
3. Control with an automatic monitoring system (for atrium and windows with incident direct sun light only - not applicable for fixed blinds/screens);

**AND**

4. Equip with a manual override function accessible by occupants (not applicable for fixed blinds/screens).

**APPROACH & IMPLEMENTATION**

Glare issues typically arise during periods of low angle sun (early morning and late afternoons) and during periods with bright sky. Glare control should therefore be designed to ensure both a view out and some level of daylight when the systems are engaged.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Typical floor plans and sections showing variable position of glare control system.
2. Brief description of proposed control mechanism to be provided.
3. Summary report to describe how view and daylight is assured when glare control system is engaged.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As-built drawings and specifications to confirm that building is constructed according to design drawing and specifications.
2. Typical floor plans and sections showing position of glare control system.
3. Description of control mechanism installed.
4. Manufacturer's Information on the blind and control systems provided.
5. Summary report to describe how view and daylight is assured when glare control system is engaged.
6. Furnish photographs of each type of typical glared control system installed.
7. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)

**EQ10****ELECTRIC LIGHTING LEVELS****1 POINT****INTENT**

Ensure office lighting level is not over-designed.

**DESCRIPTION**

Ensure office lighting level is designed in accordance to MS1525:2007 for different types of spaces.

**REQUIREMENTS**

Demonstrate that office lighting design maintains a luminance level of no more than specified in MS1525:2007 for 90% of NLA as measured at the working plane (800 mm above the floor level).

**APPROACH & IMPLEMENTATION**

The ambient lighting level should be designed in accordance with the illuminance level recommended in MS1525:2007. Task lighting may be provided for occupants who require a higher lighting level either for their own preference or for various task needs.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Summary report of lighting design brief to illustrate how the credit will be met.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built drawings showing the lighting layout plans.
2. Photometric measurements to illustrate that the lighting level fulfils the credit requirement.
3. Furnish photographs of typical floor lighting installation.
4. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)

**EQ11****HIGH FREQUENCY BALLASTS****1 POINT****INTENT**

Provide a comfortable visual working environment for occupants.

**DESCRIPTION**

Increase workplace amenity by avoiding low frequency flickers that may be associated with fluorescent light fittings.

**REQUIREMENTS**

Install high frequency ballasts in fluorescent luminaires over a minimum of 90% of NLA.

**APPROACH & IMPLEMENTATION**

Specify high frequency ballasts in fluorescent luminaires. The use of high frequency ballasts in the range of 20kHz and higher will provide smoother, non-flickering lamp operation. At this frequency, the flicker is totally undetectable to the human eye and sensory faculty.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Description of design strategy to achieve installation of high frequency ballasts for minimum 90% of NLA

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As-built lighting plans to identify location of the 90% NLA of fluorescent luminaries installed with high frequency ballasts.
2. Manufacturer's information confirming the specifications of high frequency ballasts installed.
3. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)

**EQ12****EXTERNAL VIEWS****2 POINTS****INTENT**

Reduce eyestrain for building occupants by providing long distance views and visual connection to the outdoor.

**DESCRIPTION**

Provision of view to the outside for building occupants to achieve benefits of relaxation and connectivity with the outdoor environment.

**REQUIREMENTS**

1. Demonstrate that  $\geq 60\%$  of the NLA has a direct line of sight through vision glazing at a height of 1.2m from floor level.
2. Demonstrate that  $\geq 75\%$  of the NLA has a direct line of sight through vision glazing at a height of 1.2m from floor level.

**APPROACH & IMPLEMENTATION**

Column free spaces and low interior partitions should be designed if possible. Offices should locate open plan areas along the perimeter of the façade, while private offices and areas not regularly occupied should be placed at the core of the building. Maintaining the views for spaces near the core is the primary design objective.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Typical floor plans to identify how external view for the spaces is maintained.
2. Design strategy of the interior layout that will be designed or recommended to maintain view to the outside.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As-built plans including interior layout confirming that there is direct line of sight to outside through vision glazing between 0.8 and 2.2m above the finish floor level for the required spaces.
2. For buildings where fit-out is not done, recommended interior layout shall be provided to tenants.
3. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)

**EQ13****INTERNAL NOISE LEVELS****1 POINT****INTENT**

Ensure building is designed to maintain a comfortable acoustic environment for occupants.

**DESCRIPTION**

Maintain internal noise level at an acceptable and tolerable level.

**REQUIREMENTS**

Demonstrate that 90% of the NLA do not exceed the following ambient internal noise level:-  
Within the baseline building office space, the sound level does not exceed 40dBAeq.

**APPROACH & IMPLEMENTATION**

Excessive noise can cause discomfort to occupants. Some of the solutions to ensure acceptable noise level is maintained include:

1. Specify acoustical ceiling
2. Specify furniture with sound absorbing surfaces on both sides
3. Locate photocopiers, fax machines away from the main office areas in a separate area
4. Insulate partition cavities
5. Mechanical equipment room to be located away from office and conference rooms

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Design report on strategies to ensure internal noise level is maintained at the prescribed levels.
2. Floor plans showing location of Core, M&E, and equipment rooms.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Report describing the measured internal and external noise sources and features installed to achieve required noise level.
2. As built drawings showing noise control features.
3. Manufacturer's data sheets of the acoustic materials used in building.
4. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ14

IAQ BEFORE & DURING  
OCCUPANCY

2 POINTS

**INTENT**

Maintain good Indoor Air Quality condition both before building occupancy and during building occupancy.

**DESCRIPTION**

Reduce indoor air quality problems resulting from the construction process in order to help sustain the comfort and well-being of building occupants.

**REQUIREMENTS**

Develop and implement an Indoor Air Quality Management Plan for the Pre-Occupancy Phase (1 point):

**Option 1**

Perform a building flush-out by supplying outdoor air to provide not less than 10 airchanges/hour (ACH) for at least 30 minutes operation before occupancy and continuous minimum 1 ACH during the initial 14 days occupancy of the completed building, **OR**

**Option 2**

If low VOC materials and low formaldehyde composite wood are used (EQ4 is achieved), then building flush-out can be performed by supplying outdoor air to provide not less than 10 ACH for at least 15 minutes operation or not less than 6 ACH for at least 30 minutes operation and continuous 1ACH during the initial 7 days occupancy of the completed building, **OR**

**Option 3**

Within 12 months of occupancy, conduct IAQ testing to demonstrate maximum concentrations for pollutants are not exceeded according to the Indoor Air Quality Code of Malaysia.

During Occupancy Phase (1 point):

Where a permanent air flushing system of at least 10 ACH operation is installed for use during occupancy stage.

**APPROACH & IMPLEMENTATION**

For Options 1 and 2, flush air procedure may begin once all construction work is completed. As the purpose of flushing out is to evacuate air-borne contaminants in the building, the most effective way is to use non-polluting interior materials as a source control.

For Option 3, IAQ testing procedure to confirm that the major contaminants are below recognized acceptable levels. This helps to ensure good indoor air quality for occupants.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

Summary report outlining the strategies and procedures to be taken to meet the credit requirements.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Report on building flush-out procedure including the actual dates of the flush-out.
2. If IAQ testing is carried out, a report to outline the procedures undertaken and the results of the testing to verify if the credit requirements are met or not. If not, corrective measures must be taken.
3. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 1 | NON-RESIDENTIAL | SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)**

**SM**  
**SUSTAINABLE SITE PLANNING &  
MANAGEMENT**

## PART 1 | NON-RESIDENTIAL | SUSTAINABLE SITE PLANNING &amp; MANAGEMENT (SM)

**SM1****SITE SELECTION****1 POINT****INTENT**

Avoid development of inappropriate sites and reduce the environmental impact from the location of a building on a site.

**DESCRIPTION**

Minimize ecological damage to existing natural features, water bodies, flora and fauna.

**REQUIREMENTS**

Do not develop building, hardscape, road or parking area on a site or part of a site that meet any one of the following criteria:

1. Prime agricultural land as defined by the Structure Plan of the area or the National Physical Plan.
2. Forest reserve or State Environmental Protection Zones that is specifically identified as habitat for any species found on the endangered lists.
3. Within 30 m of any wetlands as defined by the Structure Plan of the area **OR** within setback distances from wetlands prescribed in state or local regulations, as defined by local or state rule or law, whichever is the more stringent.
4. Previously undeveloped land that is within 30 m of Mean High Water Spring (MHWS) sea level which supports or could support wildlife or recreational use, or statutory requirements whichever is the more stringent.
5. Previously undeveloped land that is within 20 m of lake, river, stream and tributary which support or could support wildlife or recreational use.
6. Land which prior to acquisition for the project was public parkland, unless land of equal or greater value as parkland is provided.

**APPROACH & IMPLEMENTATION**

During site selection process, give preference to sites that have low ecological value or are not environmentally sensitive. If unavoidable, locate the building in a suitable location and with a minimal footprint so as to minimize disruption of environmentally sensitive areas.

Select sites that are stable and not prone to destructive natural events like flooding, erosion or landslides.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Survey plan and Site Plan showing footprint of building and its setback dimensions in relationship to existing natural features such as lakes, rivers, streams, tributaries, beaches, etc.
2. Recommended scale 1:500

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built site plans showing footprint of building and dimensions in relationship to existing natural features such as lakes, rivers, streams, tributaries, beaches, etc.
2. Recommended scale 1:500
3. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT



## PART 1 | NON-RESIDENTIAL | SUSTAINABLE SITE PLANNING &amp; MANAGEMENT (SM)

**SM2****BROWNFIELD REDEVELOPMENT****1 POINT****INTENT**

Redevelop and rehabilitate existing damaged or used site which is complicated by environmental contamination. This serves to channel development to brownfield sites thereby reducing pressure on opening up new greenfield sites.

**DESCRIPTION**

Existing damaged or contaminated sites are typically old industrial sites, old rubbish dumpsites, former mining land, former petrol stations, etc, where some industrial activities had taken place on the site.

**REQUIREMENTS**

Decontaminate a contaminated site, where the site was contaminated at the time of purchase, and undertake full remedial steps to decontaminate the site prior to construction.

**APPROACH & IMPLEMENTATION**

Conduct a soil condition test to determine the level of contamination.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Submit a brief historical report on the usage of the land and prepare a report certified by approved testing laboratory determining the level of contamination.
2. Submit an EIA report containing the level of contamination and the proposed action to be taken, such as the removal and replacement of soil, and other actions deemed appropriate.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Submit report and photographs of works carried out during decontamination process.
2. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | SUSTAINABLE SITE PLANNING &amp; MANAGEMENT (SM)

SM3

## DEVELOPMENT DENSITY &amp; COMMUNITY CONNECTIVITY

2 POINTS

## INTENT

Channel development to urban area with existing infrastructure, protect greenfield and preserve habitat and natural resources.

## DESCRIPTION

A higher density development or redevelopment will help minimise opening up new greenfield sites, to preserve existing habitat and natural resources, and minimise the use of private mode of transportation.

## REQUIREMENTS

## DEVELOPMENT DENSITY

Construct a new building or renovate an existing building on a previously developed site **AND** in a community with a minimum density of 20,300 m<sup>2</sup> per hectare net (87,000 ft<sup>2</sup> per acre net)

## COMMUNITY CONNECTIVITY

Construct a new building or renovate an existing building on a previously developed site **AND** within 1km of a residential zone or neighbourhood with an average density of 25 units per hectare net (10 units per acre net) **AND** within 1km of at least 10 Basic Services **AND** with pedestrian access between the building and the services.

Basic Services include, but are not limited to:

- |                          |                          |                 |                      |
|--------------------------|--------------------------|-----------------|----------------------|
| 1. Bank                  | 7. Beauty                | 13. Park        | 19. Theatre          |
| 2. Place of Worship      | 8. Hardware              | 14. Pharmacy    | 20. Community Centre |
| 3. Convenience / Grocery | 9. Laundry               | 15. Post Office | 21. Fitness Centre   |
| 4. Day Care              | 10. Library              | 16. Restaurant  |                      |
| 5. Police Station        | 11. Medical / Dental     | 17. School      |                      |
| 6. Fire Station          | 12. Senior Care Facility | 18. Supermarket |                      |

## APPROACH &amp; IMPLEMENTATION

During site selection process, give preference to sites that are within an urban area, where existing infrastructure is available.

## REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

- Submit Gross Floor Area calculations and density calculations.  
Take note that the density calculation must include the area of the project being built and is based on a typical four-storey town centre / commercial centre.
- Site plan showing building location in connection to the above Basic Services, indicating covered walkways, pedestrian access and other connections like linkbridges and underground links. Provide legend for all Basic Services.  
Proximity is determined by drawing a 1 km radius around the main building entrance on a site map and counting the services found within that radius.

## REQUIRED SUBMISSION FOR COMPLETION &amp; VERIFICATION ASSESSMENT (CVA)

- Final as-built density calculations.
- As-built Site plan showing locations of all existing services, covered walkways, pedestrian access and other connections like linkbridges and underground links.
- Provided legend colours to differentiate the types of services.
- Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | SUSTAINABLE SITE PLANNING &amp; MANAGEMENT (SM)

**SM4****ENVIRONMENT MANAGEMENT****2 POINTS****INTENT**

1. Conserve existing natural area and restore damaged area to provide habitat and promote biodiversity.
2. Maximize Open Space - Provide a high ratio of open space to development footprint to promote biodiversity.

**DESCRIPTION**

Encourage protection or restoration of the habitat and maximise the ecological diversity by introducing native or adaptive vegetation. Maximise potential for open spaces on grade or on rooftops. One useful strategy is to carefully place building to ensure minimum disruption to the existing ecosystems by minimizing the building footprint. Another is to restore the site area with native or adaptive vegetation; or by increasing the total area for planting by introducing planting on the roof.

Greenfield sites are those that are not previously developed or graded and remain in a natural state. Previously developed sites are those that previously contained building, roadway, parking lot, or were graded or altered by direct human activity.

**REQUIREMENTS**

1. Conserve existing natural area and restore damaged area to provide habitat and promote biodiversity.
2. Maximize Open Space by providing a high ratio of open space to development footprint to promote biodiversity:
  - (a) Conservation:
    - On previously developed or graded site, restore or protect a minimum of 50% of the site area (excluding the building footprint) with native or adaptive vegetation. Native or adaptive plants are plants indigenous to a locality or cultivars of native plants that are adapted to the local climate and are not considered invasive species or noxious weeds. Applicable also to landscaping on rooftops and roof gardens so long as the plants meet the definition of native or adaptive vegetation, **OR**
    - On greenfield sites, limit all site disturbance to within 12 m beyond the building perimeter; 3 m beyond surface walkway, patio, surface parking and utilities less than 300 mm in diameter; 4.5 m beyond primary roadway curb and main utility branch trench; and 7.5 m beyond constructed area with permeable surface (such as pervious paving area, storm water detention facility and playing field) that require additional staging area in order to limit compaction in the constructed area.
  - (b) Open Space:
    - Reduce by 25%, the development footprint (defined as the total area of the building footprint, hardscape, access road and parking) and/or provide vegetated open space within the project boundary to exceed the local zoning's open space requirement for the site by 25%, **OR**
    - For areas with no local zoning requirement (e.g., university campus, military bases), provide vegetated open space adjacent to the building whose area is equal to that of the building footprint, **OR**
    - Where a zoning ordinance exists, but there is no requirement for open space (zero), provide vegetated open space equal to 20% of the project's site area.

**APPROACH & IMPLEMENTATION**

For previously developed or graded sites, during concept design for multi buildings development, ensure that the proposed buildings are located close to one another. This enables more land to be freed up for planting. For a single building development, minimise the footprint or plinth area for the same purpose.

For greenfield sites, similar approach is recommended.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 1 | NON-RESIDENTIAL | SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)**

**SM4**

**ENVIRONMENTAL MANAGEMENT  
(CONTINUED)**

**2 POINTS**

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Site plan showing setback dimensions, outlines of building plinth, hardscape and softscape areas (Landscape). (to scale)
2. Landscape plans showing the percentage area covered by native or adaptive vegetation. (to scale)
3. Name list of plants and characteristics.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As-built coloured Site Plan with mark outline of building plinth, hardscape and softscape areas.
2. Landscape as-built plans showing the percentage area covered by nature or adaptive vegetation.
3. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | SUSTAINABLE SITE PLANNING &amp; MANAGEMENT (SM)

**SM5****EARTHWORKS - CONSTRUCTION  
ACTIVITY POLLUTION CONTROL****1 POINT****INTENT**

Reduce pollution from construction activities by controlling soil erosion, waterway sedimentation and airborne dust generation.

**DESCRIPTION**

Construction sites are usually responsible for significant environmental pollution. Encourage the introduction of and implementation of a policy to achieve ALL 3 objectives of control soil erosion, sedimentation and surface run-off, and air pollution.

**REQUIREMENTS**

1. Reduce pollution from construction activities by controlling soil erosion, waterway sedimentation and airborne dust generation by creating and implementing an Erosion and Sedimentation Control (ESC) Plan for all construction activities associated with the project. The ESC Plan shall conform to the erosion and sedimentation requirements of the approved Earthworks Plans OR Local erosion and sedimentation control standards and codes, whichever is the more stringent.
2. The ESC plan shall describe the measures implemented to accomplish the following objectives:
  - Prevent loss of soil during construction by storm water runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse.
  - Prevent sedimentation of storm sewer or receiving stream.
  - Prevent polluting the air with dust and particulate matter.

**APPROACH & IMPLEMENTATION**

A proper ESC Plan should be adopted and understood by all consultants and owner early during design stage and captured in the tender for the works.

This is followed by a strict implementation of the ESC Plan during construction.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

Submit Proposed ESC Plan.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Submit ESC report, complete with photographic evidence and site reports verified by qualified person.
2. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 1 | NON-RESIDENTIAL | SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)****SM6****QLASSIC - QUALITY ASSESSMENT SYSTEM  
FOR BUILDING CONSTRUCTION WORK****1 POINT****INTENT**

Achieve quality of workmanship in construction works by subscribing to CIDB's Quality Assessment System for Building Construction (QLASSIC).

**DESCRIPTION**

Reward for achieving minimum score of 70% using QLASSIC Assessment System.

**REQUIREMENTS**

Achieve quality of workmanship in construction works:

Subscribe to an independent method system to assess and evaluate quality of workmanship of building project based on CIDB's CIS 7: Quality Assessment System for Building Construction Work (QLASSIC). Project should achieve a minimum score of 70%.

**APPROACH & IMPLEMENTATION**

1. In the Project Quality Plan, QLASSIC is to be adopted and understood by all consultants and owner early during design stage and captured in the tender for the works.
2. All contractors and sub-contractors are to be aware of QLASSIC score targets (tender documentation).
3. All contractors and sub-contractors are to be QLASSIC compliance at tender stage and Strict Implementation of QLASSIC during construction to be monitored by qualified persons.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

Submit Project Quality Plan and commitment to subscribe to QLASSIC.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Certification by CIDB of score achieved.
2. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | SUSTAINABLE SITE PLANNING &amp; MANAGEMENT (SM)

**SM7****WORKER'S AMENITIES****1 POINT****INTENT**

Reduce pollution from construction activities by controlling pollution from waste and rubbish from workers.

**DESCRIPTION**

Controlling Pollution from waste and rubbish from workers is as vital as that from all other construction processes.

**REQUIREMENTS**

Create and implement a Site Amenities Plan for all construction workers associated with the project.

The plan shall describe the measures implemented to accomplish the following objectives:

1. Proper accommodation for construction workers at the site or at temporary rented accommodation nearby.
2. Prevent pollution of storm sewer or receiving stream by having proper septic tank.
3. Prevent polluting the surrounding area from open burning and proper disposal of domestic waste.
4. Provide adequate health and hygiene facilities for workers on site.

**APPROACH & IMPLEMENTATION**

Site Amenities Plan is intended to achieve the objective of ensuring adequate health and hygiene facilities are available for workers in order to minimize pollution caused by workers.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Submit Site plan showing locations of all site staff and workers' amenities and health & hygiene facilities.
2. Submit Building Plan of Site Amenities (to scale).

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Report, complete with photographic evidence and site reports verified by qualified person.
2. Describe any deviation or addition to the DA submission.

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## PART 1 | NON-RESIDENTIAL | SUSTAINABLE SITE PLANNING &amp; MANAGEMENT (SM)

**SM8****PUBLIC TRANSPORTATION ACCESS****1 POINT****INTENT**

Reduce pollution and land development impacts from automobile use.

**DESCRIPTION**

Reduce pollution and land development impacts from private car use. During site selection process, give preference to sites that are located within 1km radius of existing public transportation system.

**REQUIREMENTS**

Reduce pollution and land development impacts from automobile use:

1. Locate project within 1 km of an existing, or planned and funded, commuter rail, or light rail station, **OR**
2. Locate project within 500 m of at least one bus stop.

**APPROACH & IMPLEMENTATION**

During concept design stage, plan the building in a manner whereby easy access is available for building users to commute using public transport.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

Submit Site plan showing the site and building orientation, and highlight the locations of existing and planned public transport facilities. (Aerial Google Map is acceptable). Mark the radii from the building entrance to the various transportation systems.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As-built Site Plan with marked up transportation system facilities and complete with photographic verification.
2. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT



PART 1 | NON-RESIDENTIAL | SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

<b>SM9</b>	<b>GREEN VEHICLE PRIORITY</b>	<b>1 POINT</b>
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**INTENT**

Reduce pollution and land development impacts from automobile use.

**DESCRIPTION**

Provide preferred parking areas for green vehicles, thereby encouraging the use of such vehicles (e.g. hybrid or electric vehicles).

**REQUIREMENTS**

Encourage use of green vehicles:-

1. Provide preferred parking for low-emitting and fuel-efficient vehicles for 5% of Full-Time Equivalent (FTE) occupants.
2. "Preferred parking" refers to the parking spots that are closest to the main entrance of the project (exclusive of spaces designated for handicapped or parking passes provided at a discounted price).

**APPROACH & IMPLEMENTATION**

1. During concept design stage, set aside the required number of carpark bays to be provided for green vehicles.
2. To further encourage the usage of green vehicles, locate the required carpark bays near lift lobbies.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Submit calculations of minimum required carpark bays (local zoning requirements).
2. Plans showing the locations and numbers of carpark bays reserved for green vehicles. Demonstrate the 5% FTE calculations.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Submit As-built plans showing locations and the allocated 5% FTE carpark bays.
2. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | SUSTAINABLE SITE PLANNING &amp; MANAGEMENT (SM)

**SM10****PARKING CAPACITY****1 POINT****INTENT**

Reduce pollution and land development impacts from single occupancy vehicle use.

**DESCRIPTION**

Reward for not over-providing parking capacity. This is to encourage the use of public transport and carpools and reduce single occupancy private vehicle use. The environmental benefits of traveling by public transport include the reduction in the emission of greenhouse gases by private cars, thereby reducing urban pollution and traffic congestion.

**REQUIREMENTS**

Discourage over-provision of car parking capacity:

1. Size parking capacity to meet, but not to exceed the minimum local zoning requirements, **AND**
2. Provide preferred parking for carpools or vanpools for 5% of the total provided parking spaces.

**APPROACH & IMPLEMENTATION**

During concept design stage, work out the minimum required number of carpark bays. Consult with and inform the local authorities at all times.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Submit detailed calculation showing the minimum number of carpark bays required by the local authorities, and the number of bays provided.
2. Submit plans showing location for preferred parking for carpools or vanpools.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Submit final carpark calculations verified by qualified persons.
2. Submit As-built drawings indicating the preferred parking for carpools or vanpools.
3. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | SUSTAINABLE SITE PLANNING &amp; MANAGEMENT (SM)

SM11

STORMWATER DESIGN –  
QUANTITY & QUALITY CONTROL

1 POINT

**INTENT**

Limit disruption of natural hydrology by reducing impervious cover, increasing on-site infiltration, and managing storm water runoff. Reduce or eliminate water pollution by reducing impervious cover, increasing onsite infiltration, eliminating sources of contaminants, and removing pollutants from storm water runoff.

**DESCRIPTION**

Minimize impact of stormwater pollution due to development.

**REQUIREMENTS**

Limit disruption of natural hydrology by reducing impervious cover, increasing on-site infiltration, and managing storm water runoff. Reduce or eliminate water pollution by reducing impervious cover, increasing onsite infiltration, eliminating sources of contaminants, and removing pollutants from storm water runoff:-

**Condition 1:** If existing imperviousness is < 50%:

Implement a storm water management plan that prevents the post development peak discharge rate and quantity from exceeding the pre-development peak discharge rate and quantity in conformance to the Storm Water Management Manual for Malaysia (MASMA).

OR

**Condition 2:** If existing imperviousness is > 50%:

Implement a storm water management plan that results in a 25% decrease in the volume of storm water runoff required under MASMA.

For either Condition, implement a storm water management plan that reduces impervious cover, promotes infiltration, and captures and treats the storm water runoff from 90% of the average annual rainfall using acceptable best management practices (BMPs).

**APPROACH & IMPLEMENTATION**

During concept design stage, conduct a thorough site evaluation on hydrology of site and prepare a study to reduce the risk of water contamination to nearby water bodies by controlling the quality and quantity of stormwater runoff from the building.

Implement a stormwater management strategy in conformance with and satisfy the objectives of MASMA.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

Submit preliminary study report complying with MASMA requirements.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Report, complete with photographic evidence and site reports signed off by qualified person on final stormwater design and management.
2. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | SUSTAINABLE SITE PLANNING &amp; MANAGEMENT (SM)

**SM12****GREENERY & ROOF****2 POINTS****INTENT**

Reduce heat island (thermal gradient difference between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.

**DESCRIPTION**

1. Minimize impact on microclimate and human wildlife habitat.
2. Reward for achieving any option. Roof application includes roofs over individual parking lots and roofs over parking structures.
3. The use of greenery on rooftops can help alleviate urban heat island effects through shading and evaporative cooling. It also enhances aesthetics to the surrounding and provides a more pleasant working environment, which is also discussed in Indoor Environment Quality.

**REQUIREMENTS**

Reduce heat island (thermal gradient difference between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat:

1. Hardscape & Greenery Application:
  - (a) Provide any combination of the following strategies for 50% of the site hardscape (including sidewalks, courtyards, plazas and parking lots):
    - Shade (within 5 years of occupancy);
    - Paving materials with a Solar Reflectance Index (SRI) of at least 29;
    - Open grid pavement system;
2. Roof Application:
  - (a) Use roofing material with a Solar Reflectance Index (SRI) equal to or greater than the value in the table below for a minimum of 75% of the roof surface,
  - OR**
  - (b) Install a vegetated roof for at least 50% of the roof area,
  - OR**
  - (c) Install high albedo and vegetated roof surfaces that, in combination, meet the following criteria:
    - $(\text{Area of SRI Roof} / 0.75) + (\text{Area of vegetated roof} / 0.5) > \text{Total Roof Area}$
    - Roof Type Slope SRI
    - Low-Sloped Roof < 2:12 78
    - Steep-Sloped Roof > 2:12 29

**APPROACH & IMPLEMENTATION**

During concept design stage, ensure landscaping design is incorporated, and choice of materials with preferred SRI is considered. Where possible, introduce landscaping to exposed roof surfaces.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Submit Site plan and Roof Plan showing the extent of proposed hardscape and greenery (softscape) (To scale).
2. Section drawing of the rooftop showing details of built-up roof greenery (To scale)
3. List of names of native or adaptive vegetation and their characteristics.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As-built plans and sections of roof (to scale). Submit list of materials used and their SRI values
2. Submit photographs of roof and materials.
3. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | SUSTAINABLE SITE PLANNING &amp; MANAGEMENT (SM)

**SM13****BUILDING USER MANUAL****1 POINT****INTENT**

Document Green building design features and strategies for user information and guide to sustain performance during occupation.

**DESCRIPTION**

A Building User Manual is intended to inform occupants about the active and passive design features that should be maintained throughout the lifespan of the building.

**REQUIREMENTS**

Provide a Building User Manual which documents all the passive and active features that are part of the building, and highlight all passive and active features that should not be downgraded.

**APPROACH & IMPLEMENTATION**

The preparation of the Building User Manual should commence during design concept stage and continue to be developed during all subsequent stages up to and including construction. Participation by all consultants and building owner is recommended.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

Commitment to develop Building User Manual and furnish framework of contents.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Building User Manual.
2. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 1 | NON-RESIDENTIAL | MATERIALS AND RESOURCES (MR)**

**MR**  
**MATERIALS AND RESOURCES**

## PART 1 | NON-RESIDENTIAL | MATERIALS AND RESOURCES (MR)

MR1

MATERIALS REUSE AND  
SELECTION

2 POINTS

## INTENT

Encourage designers to specify the usage of reused building materials in new buildings.

## DESCRIPTION

Reuse building materials and products to reduce demand for virgin materials and reduce creation of waste. This serves to reduce environmental impact associated with extraction and processing of virgin resources. Integrate building design and its buildability with selection of reused building materials, taking into account their embodied energy, durability, carbon content and life cycle costs.

## REQUIREMENTS

One (1) point: Where reused products/materials constitutes  $\geq 2\%$  of the project's total material cost value, **OR**

Two (2) points: Where reused products/materials constitutes  $\geq 5\%$  of the project's total material cost value

## APPROACH &amp; IMPLEMENTATION

The following approach can achieve this credit by using:

- 1. Reused Materials found on site** : Fixed components such as doors, cabineries, posts etc. that no longer serve their original function are refurbished, reconditioned and installed for a different use or in a different location.
- 2. Reused Materials found off site** : Use of salvaged materials found off site. They must be previously used or they may be relocated from another facility.
- 3. Temporary structures** : Temporary formwork, framing and structures etc that can be reused many times before disposal (5-10 cycles of usage) can also be included. If the temporary structures are not new procurement for this project but have been used previously in other project/s, state the number of re-use that are remaining (e.g. use of system formwork is encouraged).

## REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. List of anticipated reused or salvaged materials for the project.
2. Cost of each proposed reused or salvaged materials.
3. Establish the estimated Total Cost of the materials for the project.

## REQUIRED SUBMISSION FOR COMPLETION &amp; VERIFICATION ASSESSMENT (CVA)

1. Documentation during the construction stage including photographs of the reused materials.
2. List of reused or salvaged materials used in the project after completion and their locations in the building.
3. Cost of each reused or salvaged materials either based on actual cost paid or replacement value of the material.
4. Provide the Actual Total Cost of the materials in the project.
5. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | MATERIALS AND RESOURCES (MR)

**MR2****RECYCLED CONTENT MATERIALS****2 POINTS****INTENT**

Encourage designers to specify the usage of recycled content materials in new buildings.

**DESCRIPTION**

Increase demand for building products that incorporate recycled content materials in their production (Recycled content shall be defined in accordance with the ISO 14021 document).

**REQUIREMENTS**

One (1) point: Where use of materials with recycled content is such that the sum of post-consumer recycled plus one-half of the pre-consumer content constitutes > 10% (based on cost) of the total value of the materials in the project, **OR**

Two (2) points: Where use of materials with recycled content is such that the sum of post-consumer recycled plus one-half of the pre-consumer content constitutes > 30% (based on cost) of the total value of the materials in the project.

**APPROACH & IMPLEMENTATION**

1. The goal in using materials with recycled content should be established during the design phase. The project team must identify materials with recycled content and such availability should be coordinated (as early as possible) by the project team with the contractor, subcontractors and suppliers.
2. The quantum and value of the recycled content of the materials to the total material cost must be documented by the project team.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Calculation of the recycled content value of each material must be provided.
2. The percentage of post-consumer and/or pre-consumer recycled content can be established by cost: or by weight (converted to cost).
3. Information on the sources/suppliers on the materials with recycled content must be provided.

Submit estimated value of the materials with recycled content against the estimated total value of the materials for the project.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Documentation during the construction stage including photographs of the installed reused materials.
2. Calculation of the recycled content value of each material must be provided.
3. Information on the sources/suppliers on the materials with recycled content must be provided.
4. Calculate the total percentage (based on cost) value of the materials with recycled content against the actual total value of the materials for the project. The percentage of post-consumer and/or pre-consumer recycled content must be established by cost.
5. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT



## PART 1 | NON-RESIDENTIAL | MATERIALS AND RESOURCES (MR)

**MR3****REGIONAL MATERIALS****1 POINT****INTENT**

Encourage sourcing of regional materials to reduce environmental impacts due to transportation.

**DESCRIPTION**

Use building materials and products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

**REQUIREMENTS**

Use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500km radius of the project site for  $\geq 20\%$  (based on cost) of the total material value. Mechanical, electrical and plumbing components shall not be included. Only include materials permanently installed in the project.

**APPROACH & IMPLEMENTATION**

1. This credit must be evaluated early in the design process as materials and products that can be sourced locally can be established.
2. The contractors and suppliers to verify the availability of materials which are extracted/harvested/ recovered and manufactured locally. This will ensure that the project team is aware on the availability of such materials and give focus on the materials that will contribute the most to this credit.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. List of products that are extracted/harvested/recovered and manufactured within 500 km. of the project site.
2. Provide the following:
  - Name of the manufacturer,
  - Product cost, **AND**
  - The distance between the project site and the manufacturer.
3. Determine the estimated total Material Cost.
4. Calculate the percentage of regional materials used = Total Cost of Regional Materials (RM) / Total Material Cost (RM).

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. List of products that are extracted/harvested/recovered and manufactured within 500 km. of the project site after completion.
2. Provide the following:
  - Name of the manufacturer,
  - Product cost, **AND**
  - The distance between the project site and the manufacturer.
3. Determine the Actual Total Material Cost.
4. Calculate the percentage of regional materials used = Total Cost of Regional Materials (RM) / Total Material Cost (RM).
5. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | MATERIALS AND RESOURCES (MR)

**MR4****SUSTAINABLE TIMBER****1 POINT****INTENT**

Promote responsible forest management.

**DESCRIPTION**

Encourage environmentally responsible forest management.

**REQUIREMENTS**

Where  $\geq 50\%$  of wood-based materials and products used are appropriately certified. These components include, but are not limited to, structural framing and general dimensional framing, flooring, sub-flooring, wood doors and finishes. Include wood materials permanently installed and also temporarily purchased for the project. Materials must comply with the Forest Stewardship Council (FSC) and Malaysian Timber Certification Council (MTCC) requirements.

**APPROACH & IMPLEMENTATION**

1. Establish the volume and types of wood products used in the project. Check the availability of the wood species and products that complies with FSC and MTCC requirements by making contact with the local vendors, suppliers and manufacturers that provide the required certifications.
2. Provide a list of certified vendors, suppliers and manufacturers to the contract bidders.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. List all new wood products specified in the project and identify which components are FSC and MTCC certified.
2. Indicate the estimated volume of each wood product.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. List all new wood products used in the project and identify which components are FSC and MTCC certified.
2. The volume of each wood product must be shown.
3. The vendor's chain-of-custody (COC) number must be shown in the invoice to verify FSC and MTCC certifications.
4. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | MATERIALS AND RESOURCES (MR)

**MR5****STORAGE & COLLECTION OF RECYCLABLES****1 POINT****INTENT**

Provide dedicated areas and storage bins for non-hazardous materials for recycling during BOTH construction and building occupancy.

**DESCRIPTION**

Facilitate reduction of waste generated during construction and during building occupancy that is hauled and disposed off in landfills.

**REQUIREMENTS**

1. During Construction, provide dedicated area/s and storage for collection of non-hazardous materials for recycling, **AND**
2. During Building Occupancy, provide permanent recycle bins. The waste that should be collected as a minimum should include aluminium, paper, plastics, glass, corrugated cardboard and batteries.

**APPROACH & IMPLEMENTATION**

1. During construction, designate a dedicated area where on-site sorting of waste materials can be stored in separate skips for collection to recycling facilities. This is tied in with credit MR6: Construction Waste Management.
2. During Building Occupancy, designate storage areas for recyclable materials that are clearly labeled for recycling, placed within accessible reach of the building occupants and in a location with easy vehicular access to facilitate collection.
3. The size of the storage space allocated should be adequate to store the recyclable waste volume generated by the building occupants/operation.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Floor plans showing the proposed locations of the storage areas for recyclables and their proximity to the building entrance and vehicular access point/s.
2. Ensure that the space provided for recyclables is in addition to the storage space allocated for general waste.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As-built plans showing the locations of the storage area for recyclables. The plans should indicate the proximity of the storage from the building entrance.
2. Photographs showing the location, size, storage provision and labeling of dedicated facilities during construction.
3. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | MATERIALS AND RESOURCES (MR)

**MR6****CONSTRUCTION WASTE  
MANAGEMENT****2 POINTS****INTENT**

Reduce and recycle construction waste materials and divert from disposal to landfills.

**DESCRIPTION**

Develop and implement a construction waste management plan that, as a minimum, identifies the materials to be diverted from disposal regardless of whether the materials will be sorted on site or co-mingled. Quantify by measuring total truck loads of waste sent for disposal.

**REQUIREMENTS**

One (1) point: Recycle and/or salvage  $\geq$  50% volume of non-hazardous construction debris **OR**

Two (2) points: Recycle and/or salvage  $\geq$  75% volume of non-hazardous construction debris.

**APPROACH & IMPLEMENTATION**

1. A waste management plan must be developed and types of construction waste identified. Excavated soil must be excluded in the calculation.
2. Identify construction haulers and recyclers to handle the designated construction waste and ensure that records are kept to verify that the materials diverted have been recycled or salvaged as intended.
3. Use of pre-cast reduces waste produced on site.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

Tabulate the anticipated diverted/recycled/landfill waste and the estimated quantity of the diverted/recycled/landfill waste.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Submit verified record of truck loads of diverted/recycled/landfill waste against total truck loads, supported by copy of the construction waste management plan.
2. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | MATERIALS AND RESOURCES (MR)

**MR7****REFRIGERANTS & CLEAN AGENTS****2 POINTS****INTENT**

Demonstrate leadership in accelerating phase-out of all Ozone Depleting Substances. Recognise and promote use of low Global Warming Substances.

**DESCRIPTION**

Use environmentally-friendly Refrigerants and Clean Agents exceeding Malaysia's commitment to the Montreal & Kyoto protocols.

**REQUIREMENTS**

One (1) point: Use zero Ozone Depleting Potential (ODP) products: non-CFC refrigerants/clean agents,

One (1) point: Use non-synthetic (natural) refrigerants/clean agents with zero ODP and negligible GWP.

**APPROACH & IMPLEMENTATION**

1. Use synthetic refrigerants (for HVAC) and clean agents (for fire fighting) with zero ODP such as HFCs that exceeds Malaysia's commitment to the Montreal & Kyoto protocols.
2. Use non-synthetic (natural) refrigerants (for HVAC) and clean agents (for fire fighting) with zero ODP and negligible Global Warming Potential (GWP) such as water, hydrocarbon, carbon dioxide, ammonia and etc (for HVAC); and nitrogen, argon, water mist and etc (for fire fighting).

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

Submit proposed types of refrigerants and clean agents to be used and/or if no refrigerants or clean agents will be used.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Submit list of as-installed refrigerants and clean agents.
2. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

PART 1 | NON-RESIDENTIAL | WATER EFFICIENCY (WE)

**WE**  
**WATER EFFICIENCY**

## PART 1 | NON-RESIDENTIAL | WATER EFFICIENCY (WE)

**WE1****RAINWATER HARVESTING****2 POINTS****INTENT**

Encourage rainwater harvesting that will lead to reduction in potable water consumption.

**DESCRIPTION**

Maximise rainwater collection from rooftop or runoff rainwater systems for building consumption and/or irrigation.

**REQUIREMENTS**

Achieve the following percentage in reduction of potable water consumption:

One (1) point: For 15% or more reduction, **OR**

Two (2) points: For 30% or more reduction.

Submit calculation demonstrating reduction in water consumption compared to the building base condition.

**APPROACH & IMPLEMENTATION**

The two (2) main approaches to rainwater harvesting are collection of runoff rainwater from surrounding site and roof top rainwater harvesting. Both systems require separate water storage tanks and additional pressure boosting equipment may be required. Gravity fed system is encouraged to avoid additional energy use for pumping. Use rainwater for non-potable applications such as toilets and urinal flushing, landscape irrigation, washing clothes etc.

Water purifying system may be necessary depending on the application and methodology of harvesting the rainwater. Where rainwater filtration/purification is required, use of ozone or activated oxygen in lieu of chlorine or other GHG chemicals, is preferred to obviate negative environmental impact.

Rainwater harvesting calculation method and parameters adopted using GBI recognized Standards, Codes or Guides are acceptable.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. A technical report describing the concept and details of rainwater collection, conveyance system (gutters/downpipes or equivalent), filtration system (if any), storage facility and distribution system.
2. The technical report shall include schematics showing how the rainwater is to be harvested and utilised.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Final as-installed calculation of rainwater harvested, storage tank capacity and building usage distribution system.
2. As Built drawings for rainwater harvesting system and storage tank location (Recommended scale 1:200).
3. Furnish photographs of as installed main equipment and components.
4. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | WATER EFFICIENCY (WE)

**WE2****WASTE WATER RECYCLING****2 POINTS****INTENT**

To encourage water recycling that will lead to reduction in potable water consumption.

**REQUIREMENTS**

To encourage recycling of greywater or blackwater for building and irrigation use to reduce discharge to external sewer, thereby reducing the overall building potable water consumption.

To encourage and recognise building design that reduces water flow to sewerage treatment plants.

**REQUIREMENTS**

One (1) point: For 10% or more wastewater being treated and recycled, **OR**

Two (2) points: For 30% or more wastewater being treated and recycled.

**APPROACH & IMPLEMENTATION**

Water treatment systems and re-use technology options are acceptable for treating greywater and blackwater. The treated water is then recycled for use in irrigation, toilet flushing etc. Sand filters can be a cost effective treatment technique.

**POTENTIAL TECHNOLOGIES & STRATEGIES**

1. Consider channeling greywater from sinks, showers and other sources to wastewater treatment plant.
2. Options for on-site wastewater treatment include packaged biological nutrient removal systems and high efficiency filtration systems.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Preliminary calculation to demonstrate the percentage of wastewater to be treated and recycled.
2. A technical report describing the concept and details of the recycling and treatment plant, conveyance system, storage facility and distribution system.
3. The technical report shall include schematics showing how the wastewater is recycled, stored and utilised.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Final as-installed calculation of the recycled and treated wastewater, storage tank capacity and distribution system.
2. As Built drawings for wastewater recycling and treatment system, and storage tank location (to scale).
3. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT



## PART 1 | NON-RESIDENTIAL | WATER EFFICIENCY (WE)

**WE3****WATER EFFICIENT LANDSCAPING****2 POINTS****INTENT**

To encourage and recognise the design of landscaping system that minimises or does not require the use of potable water supply from the local water authority.

**DESCRIPTION**

The main aim is to reduce the consumption of potable water for landscape irrigation. This may be achieved through the use of native or adaptive plants to reduce potable water consumption.

**REQUIREMENTS**

One (1) point: For reducing potable water consumption for landscape irrigation by 50% or more, **OR**

Two (2) points: For not using potable water at all for landscape irrigation.

**APPROACH & IMPLEMENTATION**

1. Design a water-efficient landscape by selecting native or adaptive plants that require minimal water.
2. Reduce or eliminate use of potable water for landscape irrigation system.

**POTENTIAL TECHNOLOGIES & STRATEGIES**

Perform soil / climate analysis to determine appropriate plant material and design the landscape with native or adaptive plants to reduce or eliminate irrigation requirements. Where irrigation is required, use high efficiency equipment and/or climate based controllers.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. A brief description of the system with references to Guidelines used, calculations, and an explanation of how the system meets the requirement for the credit.
2. A brief report by a landscape architect detailing the selection of native adaptive vegetation and the water efficient irrigation system and demonstrating that it will meet all the requirements for the credit.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built plans showing the detail location of the planted native adaptive vegetation and installed water efficient irrigation system (to scale).
2. Calculation of the reduction of potable water for landscape irrigation.
3. Furnish photographs of the vegetation installed.
4. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | WATER EFFICIENCY (WE)

**WE4****WATER EFFICIENT FITTINGS****2 POINTS****INTENT**

To encourage reduction in potable water consumption through use of efficient devices.

**REQUIREMENTS**

One (1) point: For reduction of 30% or more annual potable water consumption, **OR**

Two (2) points: For reduction of 50% or more annual potable water consumption.

Submit calculation to demonstrate that the fittings selected will reduce the potable water consumption compared to the building base conditions.

**APPROACH & IMPLEMENTATION**

1. The use of water efficient water closets, wash hand basins or shower heads or systems which has the potential to reduce potable water consumption in the building.
2. Specify the use of automatic self-closing faucets, electronic or otherwise, to eliminate wastage through faucets left running unnecessarily.
3. Specify the use of modified waterless urinals.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. A brief description of the system and an explanation of how the system meets the requirement for the credit.
2. Submit proposed makes of the intended fittings.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Tabulation of all as-installed water efficient fittings and calculations to verify percentage of water saved to meet the requirement for the credit.
2. Submit manufacturer's details of the installed fittings.
3. Furnish photographs of each type of water efficient fittings as installed.
4. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | WATER EFFICIENCY (WE)

**WE5****METERING & LEAK DETECTION SYSTEM****2 POINTS****INTENT**

To encourage the design of systems that allows monitoring and management of water consumption.

**REQUIREMENTS**

- One (1) point: For incorporation of sub-meters to monitor and manage major water usage systems such as cooling towers, irrigation, kitchens and tenant spaces,
- One (1) point: For linking sub-meters to EMS to facilitate early detection of water leakage.

**APPROACH & IMPLEMENTATION**

1. Specify the provisions of sub-meters for major water consuming systems/equipment.
2. Incorporate EMS monitoring system of sub-meters.

**POTENTIAL TECHNOLOGIES & STRATEGIES**

1. To incorporate provisions of analogue or digital flow water sub-meters.
2. Incorporation of EMS monitoring will enable early detection of water leakage and contain water wastage.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

Describe proposed provision of sub-meters of all major water consuming system/equipment and interface with EMS.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Submit tabulated inventory of as-installed sub-meters.
2. As built plans of the building showing the location of sub-meters.
3. Furnish photographs of typical sub-meter installed.
4. Sample of actual EMS report recording consumption and simulated leakage.
5. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

PART 1 | NON-RESIDENTIAL | INNOVATION (IN)

**IN**  
**INNOVATION**

## PART 1 | NON-RESIDENTIAL | INNOVATION (IN)

**IN1****MINIMUM IN1 PERFORMANCE****6 POINTS****INTENT**

Provides opportunity for the project to be awarded points for exceptional performance above the requirements set by GBI rating system.

**DESCRIPTION**

Reward innovation and initiatives.

**REQUIREMENTS**

Encourage project team to score points for exceptional performance above the requirements set by GBI rating system:

1 point for each approved innovation and environmental design initiative up to a maximum of 6 points, for innovative ideas such as, but not limited to:

1. Condensate water recovery (accounting for at least 50% of total AHUs/FCUs) for use as cooling tower make-up water or other suitable application;
2. Co-generation / Tri-generation system;
3. Thermal / PCM / Thermal Mass storage system (accounting for at least 25% of total required cooling capacity);
4. Solar thermal technology / Solar Airconditioners (generating at least 10% of total required cooling capacity);
5. Heat recovery system (contributing to at least 10% of total required capacity);
6. Heat pipe technology (contributing to at least 75% of relevant applications);
7. Light pipes (generating at least 10% of the total lighting capacity);
8. Auto-condenser tube cleaning system (fitted to plant equipment serving at least 50% of total capacity);
9. Non-chemical water treatment system (serving at least 50% of total capacity);
10. Mixed mode / low energy ventilation system;
11. Advanced air filtration technology (serving at least 50% of the NLA);
12. Waterless urinals (fitted to all male toilets);
13. Central vacuum system (serving at least 50% of NLA);
14. Central Pneumatic Waste Collection system;
15. Self-cleaning façade;
16. Electrochromic glazed façade;
17. Refrigerant leakage detection and recycling facilities (catering for the whole main plant);
18. Recycling of all fire system water during regular testing.

Project team may submit any innovation not listed above to GBI for consideration and approval of credit point.

**APPROACH & IMPLEMENTATION**

During Concept Design Stage, commence discussions on all possible innovation ideas to be incorporated into the building early. Late incorporation of innovation ideas may be difficult and costly.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

Report on each innovation, how it is derived, and how it would assist in reducing energy and improving sustainable design.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Full documentation and photographic evidence of each innovation, and the process from commencement to commissioning, complete with drawings, manuals and maintenance write-up.
2. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 1 | NON-RESIDENTIAL | INNOVATION (IN)

**IN2****GREEN BUILDING INDEX  
FACILITATOR****1 POINT****INTENT**

To support and encourage the design integration required for Green Building Index rated buildings and to streamline the application and certification process.

**DESCRIPTION**

Encourage and promote green technology service providers.

**REQUIREMENTS**

Support and encourage the design integration required for Green Building Index rated buildings and to streamline the application and certification process, where:

At least one principal participant of the project team shall be a Green Building Index Facilitator who is engaged at the onset of the design process until completion of construction and Green Building Index certification is obtained. Name of the GBI Facilitator shall be inserted in GBI Application & Registration Form.

**APPROACH & IMPLEMENTATION**

Appoint a Green Building Index Facilitator early to assist in the concept design stage, and ensure that the Facilitator follows through the entire project.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Proof of appointment of the named GBI Facilitator.
2. GBI Facilitator to present DA submission to GBI Certifier.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. GBI Facilitator to present CVA submission to GBI Certifier.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT



**DESIGN REFERENCE GUIDE**  
**PART 2**  
**RESIDENTIAL NEW CONSTRUCTION (RNC)**

**PART 2 : RESIDENTIAL NEW CONSTRUCTION (RNC)**

## ASSESSMENT CRITERIA

### OVERALL POINTS SCORE

PART	ITEM	MAXIMUM POINTS	SCORE
1	Sustainable Site Planning & Management	39	
2	Energy Efficiency	23	
3	Water Efficiency	12	
4	Indoor Environmental Quality	11	
5	Material & Resources	9	
6	Innovation	6	
<b>TOTAL SCORE</b>		<b>100</b>	

## GREEN BUILDING INDEX CLASSIFICATION

POINTS	GBI RATING
86+ points	Platinum
76 to 85 points	Gold
66 to 75 points	Silver
50 to 65 points	Certified



## PART 2 : RESIDENTIAL NEW CONSTRUCTION (RNC)

### 2.1 SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

2.1.1	SM1	: Site Selection
2.1.2	SM2	: Public Transportation Access
2.1.3	SM3	: Community Services & Connectivity
2.1.4	SM4	: Open Spaces, Landscaping & Heat Island Effect
2.1.5	SM5	: Construction System & Site Management
2.1.6	SM6	: Storm Water Management
2.1.7	SM7	: Re-development of Existing sites & Brownfield Re-development
2.1.8	SM8	: Avoiding Environmentally Sensitive Areas
2.1.9	SM9	: Building User Manual

### 2.2 ENERGY EFFICIENCY (EE)

2.2.1	EE1	: Minimum EE Performance
2.2.2	EE2	: Renewable Energy
2.2.3	EE3	: Advanced EE Performance – BEI
2.2.4	EE4	: Home Office & Connectivity
2.2.5	EE5	: Sustainable Maintenance

### 2.3 WATER EFFICIENCY (WE)

2.3.1	WE1	: Rainwater Harvesting
2.3.2	WE2	: Water Recycling
2.3.3	WE3	: Water Efficient - Irrigation/Landscaping
2.3.4	WE4	: Water Efficient Fittings

### 2.4 INDOOR ENVIRONMENTAL QUALITY (EQ)

2.4.1	EQ1	: Minimum IAQ Performance
2.4.2	EQ2	: Daylighting
2.4.3	EQ3	: Sound Insulation
2.4.4	EQ4	: Good Quality Construction
2.4.5	EQ5	: Volatile Organic Compounds
2.4.6	EQ5	: Formaldehyde Minimisation
2.4.7	EQ6	: Post Occupancy Evaluation: Verification

### 2.5 MATERIALS & RESOURCES (MR)

2.5.1	MR1	: Storage & Collection of Recyclables
2.5.2	MR2	: Materials Reuse and Selection
2.5.3	MR3	: Construction waste management
2.5.4	MR4	: Recycled Content Materials
2.5.5	MR5	: Regional Materials
2.5.6	MR6	: Sustainable Timber

### 2.6 INNOVATION (IN)

2.6.1	IN1	: Innovation in Design & Environmental Design Initiatives
2.6.2	IN2	: Maintenance Program or Green Building Index Accredited Facilitator

**PART 2 | RESIDENTIAL | SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)**

**SM**  
**SUSTAINABLE SITE PLANNING &  
MANAGEMENT**

**PART 2 | RESIDENTIAL | SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)****SM1****SITE SELECTION & PLANNING****1 POINT****INTENT**

Avoid development of inappropriate sites and reduce the environmental impact from the location of a building on a site. Proposed development is appropriate for the site, complies with the Local Plan or Structure Plan for the area and does not overburden the available infrastructure.

**DESCRIPTION**

Minimize inappropriate developments that do not comply with the Local Plan or Structure Plan for the area or exceed the available or planned infrastructure

**REQUIREMENTS**

1. Approved Layout plan that shows compliance with the Local Plan or Structure Plan of the area.
2. Support letters from all Infrastructure Providers of availability for all infrastructure

**APPROACH & IMPLEMENTATION**

1. Ensure the Layout plans for the project comply with the existing Structure Plan and Local Plan for the area where available.
2. Ensure Planned Development is supported by available or planned infrastructure including but not limited to Roads, Drains, Water supply, Sewerage Systems, Electricity Supply and Telecommunications systems.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Submit approved Layout Plan and Planning approval letter with list of conditions where available.
2. If planning approval has not been obtained, Layout Plan and Structure Plan / Local Plan of the area must be submitted showing compliance.
3. Show through support letters or available infrastructure plans of adequate Roads, Drains, Water supply, Sewerage Systems, Electricity Supply and Telecommunications systems.
4. Recommended scale 1:500

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Submit compliance to Planning approval portion of CCC submission to Local Authorities or supporting letter from Planning Department for the CCC.
2. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 2 | RESIDENTIAL | SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)****SM2****PUBLIC TRANSPORTATION ACCESS****12 POINTS****INTENT**

Promote the use of Public Transport for new housing projects. This is to reduce the current and future heavy dependence on private transport, the greatest contributor of Green House Gases (GHG).

**DESCRIPTION**

Reduce pollution and land development impacts from automobile use.

**REQUIREMENTS**

1. Points are awarded according to proximity of the development to public transport hubs and quality of the access to the transport hub. For new housing areas, the provision of transport hubs for the housing concerned with proper shelter, amenities, shuttle facilities and parking facilities are encouraged. Points are awarded according to the subsection categories.
2. Housing projects can be divided into two main categories .First category are for Housing projects located in Urban sites and the second category are for Sub-Urban and individual residential projects. GBI Public Transport Access will work differently for both these main categories.
3. Urban Housing projects would normally select SM2A & SM2B
4. Sub-Urban Housing projects would normally select SM2C & SM2D.
5. Provision allows for Single Residential projects( < 4 units) to transfer the 12 point score under Site Planning & Management into INNOVATION (IN)
6. For Housing Projects within Agricultural communities and Estate housing where there is NO daily commuting, this credit may be transferred to the section into INNOVATION (IN)

**APPROACH & IMPLEMENTATION**

During concept design stage, plan the building in a manner whereby easy access is available for building users to commute using public transport. Provisions for dedicated walkways and bicycle lanes are encouraged in the approach to the planning of the project and connections to transport hubs or stops.

In larger residential areas transport terminals or dedicated bus shuttle connections to community centres or shopping precincts are also encouraged.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 2 | RESIDENTIAL | SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)****SM2****PUBLIC TRANSPORTATION ACCESS  
(CONTINUED)****12 POINTS****REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Submit Site plan showing the site and building orientation, and highlight the locations of existing and planned public transport facilities. (Aerial google acceptable). Mark the radius from the building entrance to transportation system.
2. Urban Housing can select SM2A & SM2B : Mass Transport Station / Hub distance to building within 1 km ( 50% of points if from Shuttle Bus Stop )
3. SM2B encourages dedicated walkways or sheltered walkways with a maximum of 4 points.
4. Sub- Urban Housing can select SM2C & SM2D : Dedicated Transport Terminal within the Residential Area with covered seating and waiting area for a minimum of 10% of the total number of residential units of the designated residential area OR consideration will also be given for Housing projects that provide dedicated Bus shuttle services from housing enclave to community centre or shopping precincts.
5. SM2C : The full 8 point allocation is provided for projects with dedicated transport terminus with 10 % waiting provision. The points decreases when the distances increases .
6. Single residence developed < 4 units at any one time or Agricultural communities and Estate housing where there is NO daily commuting, the 12 points may be transferred to the section on INNOVATION. Additional reward points can be earned for exemplary innovation and initiatives. Innovation Criteria is a single scoring system. Each Innovation can only get a single point.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built site plan with marked up transport hub or terminus, dedicated walkways, bicycle lanes or dedicated Car parking should be shown. Alternatively a plan showing the dedicated shuttle bus system and stops plus report on system routing and frequency can be submitted.
2. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 2 | RESIDENTIAL | SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)****SM3****COMMUNITY FACILITIES****8 POINTS****INTENT**

Community Facilities are for the convenience of house owners. Community facilities in close proximity or within the vicinity of new housing areas reduces impact from automobile use.

**DESCRIPTION**

Encourage close proximity of Amenities to reduce automobile use.

**REQUIREMENTS**

Points are awarded according to proximity of the development to community amenities. For new housing areas, the provision of basic/essential amenities and enhancements is encouraged. Points are scored according to the sub-section categories.

The community services and amenities are grouped in terms of priority into three categories; SM3A, SM3B and SM3C. Scoring for each category is independent from one another. A total maximum score of 8 points can be obtained for this section. The project team is to select the most appropriate category. All amenities described under each category must fall within the specified distance to qualify for the points.

**SM3A - BASIC AMENITIES (4 Points)**

Basic Amenities as listed below are provided or are available within 750m of the residential units (1 point per item or equivalent up to maximum of 4 points. Less 1 point if more than 750m away):

1. Grocery Store or Mini-market
2. Restaurant or Coffee Shop
3. Surau or Mosque
4. Playground or Public Park

**SM3B - OTHER AMENITIES (2 Points)**

Other Amenities as listed below are provided or are available within 750m of the residential units (0.5 point per item or equivalent up to maximum of 2 points. Less 0.5 point if more than 750m away):

1. Clinic or Medical Centre
2. Police Station or Police Pondok
3. School or Crèche
4. Bank, Post Office or ATM

**SM3C - ADDITIONAL AMENITIES (2 Points)**

Additional Amenities as listed below are provided or are available within 750m of the residential units (0.5 point per item or equivalent up to maximum of 2 points. Less 0.5 point if more than 750m away):

1. Library
2. Community Centre or Hall
3. Wet Market or Supermarket
4. Barber Shop
5. Laundry

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 2 | RESIDENTIAL | SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)****SM3****COMMUNITY FACILITIES (CONTINUED)****8 POINTS****APPROACH & IMPLEMENTATION**

This credit encourages the provision beyond the Basic amenities or services for the benefit of homeowners. Describe any other steps taken to enhance the infrastructure and amenities.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Site Plan showing housing or individual residential location in connection to the above Basic Services, Other or Additional Amenities. Indicate distances and legend of covered walkways, pedestrian access and other connections like link bridges and underground links. Provide legend for the Amenities to achieve the design credit.
2. Proximity is determined by drawing a 750 meter radius around the main development entrance on a site map and counting the services found within that radius. Another radii at 250 meter intervals can be shown on the map for amenities that fall beyond the 750 meter radius.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As-built Site plan showing locations of all existing services, covered walkways, pedestrian access and other connections like link bridges, underground links.
2. Provide legend symbols or colours to differentiate the types of amenities.
3. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 2 | RESIDENTIAL | SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)****SM4****OPEN SPACES, LANDSCAPING & HEAT ISLAND EFFECT****4 POINTS****INTENT**

Conserve existing natural area or create larger soft landscaping area to provide habitat, promote biodiversity and reduce Heat Island Effect.

**DESCRIPTION**

Encourage protection or restoration of the habitat and maximise the ecological diversity by introducing native or adaptive vegetation. Maximise potential for open spaces on grade or on rooftops.

**REQUIREMENTS**

Maximize Open Space by providing a high ratio of open space to development footprint to promote biodiversity & reduce Heat Island Effect:

Provision of landscaping with indigenous plants to 10% of total development area: 1 point.

Landscaping with indigenous plants up to 15% of total development area: 2 points

Landscaping with indigenous plants up to 20 % of total development area: 3 points

Landscaping with indigenous plants up to 25% or more of total development area can achieve 4 points maximum.

**APPROACH & IMPLEMENTATION**

For previously developed or graded sites, during concept design, for multi buildings development, ensure that the proposed buildings are located close to one another. This enables more land to be freed up for planting. For a single building development, minimise the footprint or plinth area for the same purpose.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Site plan showing setback dimensions, outlines of building plinth, hardscape areas.(To scale).
2. Landscape plan showing the percentage area covered by native or adaptive vegetation (To scale)
3. Name list of plants and characteristics.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As-built coloured Site Plan with marked outline of building plinth, hardscape and softscape areas. Indicate area for area out of total site area.,
2. Landscape as-built plans showing the percentage area covered by native and adaptive vegetation.
3. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT



**PART 2 | RESIDENTIAL | SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)****SM5****CONSTRUCTION SYSTEM & SITE  
MANAGEMENT****2 POINTS****INTENT**

Encourage IBS and increased site management controls to reduce on-site construction material wastage and construction waste to landfill sites.

**DESCRIPTION**

Construction sites are usually responsible for significant environmental pollution. Adoption of Industrialized Building System can reduce the amount of construction work on site.

**REQUIREMENTS**

A construction with a CIDB IBS score >50% entitled to 1 point  
A construction with a CIDB IBS score >70% entitled to 2 point

**APPROACH & IMPLEMENTATION**

1. Ensure that a proper IBS Plan is adopted and understood by all consultants and owner early during design stage and captured in the tender for the works.
2. Ensure strict implementation of the IBS Plan during construction.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Submit Proposed IBS Plan.
2. Submit the CIDB IBS report and description of adopted IBS system

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Submit IBS report, complete with photographic evidence and site reports verified by qualified person.
2. Submit CIDB IBS Certification and scoring summary sheet.
3. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 2 | RESIDENTIAL | SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)****SM6****STORM WATER MANAGEMENT****3 POINTS****INTENT**

Limit disruption of natural hydrology by reducing impervious cover, increasing on-site infiltration, eliminating sources of contaminants and managing storm water runoff.

**DESCRIPTION**

Manage surface water run off from developments. Reduce the pollution and storm water loading of the river systems from the development. Encourage rainwater for recycling.

**REQUIREMENTS**

1. Demonstrate the development complies to MASMA's minimum requirements will be entitled 1 point
2. Developments that demonstrate exceeding MASMA requirements by 30% is entitled to 2 additional points. These points are pro rated for lower value.
3. For either Condition, implement a storm water management plan that reduces impervious cover, promotes infiltration, and captures and treats the storm water runoff from 90% of the average annual rainfall using acceptable best management practices (BMPs).

**APPROACH & IMPLEMENTATION**

1. During concept design stage, conduct a thorough site evaluation and prepare a study to reduce the risk of water contamination to nearby water bodies by controlling the quality and quantity of stormwater runoff from the building.
2. Implement a stormwater management strategy in conformance with and satisfy the objectives of MASMA.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Submit preliminary study report complying with MASMA requirements and development target.
2. Submit report on proposed systems or method of stormwater management for the site.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Report, complete with photographic evidence and site reports signed off by qualified person on final stormwater design and management.
2. As-Built Site Plan of completed project to scale.
3. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 2 | RESIDENTIAL | SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)****SM7****RE-DEVELOPMENT OF EXISTING  
SITE & BROWNFIELD SITES****4 POINTS****INTENT**

Encourage development on Existing or Brownfield sites, reducing opening up of new Greenfield sites. This includes to redevelop and rehabilitate existing environmentally contaminated or used site.

**DESCRIPTION**

Greenfield sites are those that are not previously developed or graded and remain in a natural state. Existing developed sites are those that previously contained building, roadway, parking lot, or were graded or altered by direct human activity. Brownfield sites are used sites abandoned or contaminated, example Mining Pool land or Service station sites.

**REQUIREMENTS**

Reward rehabilitation of Brownfield site and development in existing sites.

1. Re-development of existing sites or refurbishment of existing building are awarded 2 points
2. Rehabilitation of brownfield sites are awarded 2 points

**APPROACH & IMPLEMENTATION**

Greenfield sites are those that are not previously developed or graded and remain in a natural state. Previously developed sites are those that previously contained building, roadway, parking lot, or were graded or altered by direct human activity. Brownfield sites are used sites abandoned or contaminated, example Mining Pool land or service station sites.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Existing site photographs, showing existing condition of building or site. Provide copy of environmental report (EIA) of site if available.
2. Site plan to scale with proposal and summary report on refurbishment or proposed rehabilitation of site.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Complete site photographs, showing rehabilitation or refurbishment.
2. As-Built site plan to scale with completed project and summary report on refurbishment or proposed rehabilitation of site.
3. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 2 | RESIDENTIAL | SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)****SM8****AVOID ENVIRONMENTALLY SENSITIVE SITES****2 POINTS****INTENT**

Avoid development of inappropriate sites and reduce the environmental impact from the location of a building on a site.

**REQUIREMENTS**

Do not develop buildings, hardscape, roads or parking areas on portions of sites that meet any one of the following criteria:

- Prime agricultural land as defined by the Town and Country Planning Act
- Land that is specifically identified as habitat for any species threatened or endangered lists
- Within 30 meters of any wetlands as defined by the Structure Plan of the area.

OR within setback distances from wetlands prescribed in state or local regulations, as defined by local or state rule or law, whichever is more stringent

- Previously undeveloped land that is within 15 meters of a water body, defined as seas, lakes, rivers, streams and tributaries which support or could support fish, recreation or industrial use.
- Land which prior to acquisition for the project was public parkland, unless land of equal or greater value as parkland is accepted in trade by the public landowner.
- Land which is classified as Class IV (steeper than 30 deg.)

**APPROACH & IMPLEMENTATION**

1. During site selection process, give preference to sites that have low ecological value or are not environmentally sensitive.
2. If unavoidable, locate the building in a suitable location and with a minimal footprint so as to minimize disruption of environmentally sensitive areas.
3. Select sites that are stable and not prone to destructive natural events like flooding, erosion or landslides.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

4. Survey plan and Site Plan showing footprint of building and its setback dimensions in relationship to existing natural features such as lakes, rivers, streams, tributaries, beaches, etc.
5. Recommended scale 1:500

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built site plans showing footprint of building and dimensions in relationship to existing natural features such as lakes, rivers, streams, tributaries, beaches, etc. Recommended scale 1:500
2. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 2 | RESIDENTIAL | SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)****SM9****BUILDING USER MANUAL****2 POINTS****INTENT**

Document Green building design features and strategies for user information and guide to sustain performance during occupancy.

**DESCRIPTION**

A Building User Manual is intended to inform occupants about the active and passive design features that should be maintained throughout the lifespan of the building.

**REQUIREMENTS**

Provide a Building User Manual which documents all the passive and active features that are part of the building, and highlight all passive and active features that should not be downgraded.

**APPROACH & IMPLEMENTATION**

The preparation of the Building User Manual should commence during design concept stage and continue to be developed during all subsequent stages up to and including construction. Participation by all consultants and building owner is recommended.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

Commitment to develop Building User Manual and furnish framework of contents.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Building User Manual.
2. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

PART 2 | RESIDENTIAL | ENERGY EFFICIENCY (EE)

**EE**  
**ENERGY EFFICIENCY**

## PART 2 | RESIDENTIAL | ENERGY EFFICIENCY (EE)

EE1

MINIMUM EE PERFORMANCE

2 POINTS

**INTENT**

To create EE awareness, promote the use of MS 1525 and to provide a thermally comfortable environment to reduce the use of air-conditioning in residential building, thereby reducing CO<sub>2</sub> emission.

**DESCRIPTION**

Establish minimum energy efficiency (EE) performance to reduce energy consumption in buildings, thus reducing CO<sub>2</sub> emission to the atmosphere. Meet the following minimum EE requirements as stipulated in MS 1525:2007.

**REQUIREMENTS**

1. OTTV < 50, RTTV < 25. Submit calculations using the BEIT software or other GBI approved software/s, **AND**
2. Roof U-value < 0.4 W/m<sup>2</sup>K (lightweight), U-value < 0.6 W/m<sup>2</sup>K (heavyweight).

**APPROACH & IMPLEMENTATION**

Wall insulation can be made using autoclaved lightweight concretes, composite insulated walls, double brickwall and many other option. Glazing should be optimally sized and the use of performance glazing such as low-e and/or spectrally selective glazing is encouraged. Roof should be insulated with suitable insulation materials to prevent heat gain into occupied spaces.

Solar shading devices that block out direct sunlight through glazing have a critical effect on the OTTV value of a buildings and their sizing and selection using the solar shading coefficients from the graphs derived from Tables 5,6 and 7 of MS 1525 will greatly assist in bringing down the OTTV. Insulation in roofs is a basic requirement in order to comply with MS 1525 as the greatest amount of heat entering low rise housing is through the roof.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Plan and elevations marking out wall & apertures used for the calculation coloured blue and walls & apertures not used for calculation coloured red. Recommended scale 1: 200.
2. Calculations for each facing wall.
3. Description of wall & aperture materials specified.
4. Calculations of U-values for roof and walls.
5. Proposed Glazing specifications on Shading Coefficient, U-value and visible light transmission.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built Plan and elevations marking out wall & apertures used for the calculation coloured blue and walls & apertures not used for calculation coloured red. Recommended scale 1: 200.
2. Calculations for each facing wall.
3. Description of built wall & aperture materials with U-value calculation.
4. Manufacturer issued glazing specification on shading coefficient, U-values and visible light transmission.
5. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 2 | RESIDENTIAL | ENERGY EFFICIENCY (EE)

EE2

RENEWABLE ENERGY

5 POINTS

## INTENT

To promote the use of renewable energy in residential buildings for self-supply in order to reduce environmental impact due to emission of CO<sub>2</sub>.

## DESCRIPTION

The use of renewable energy systems is to offset energy cost and promote green energy use. Calculate the project performance by expressing the energy produced by the renewable systems as a percentage of the building annual energy use. The table below display the number of points achievable.

## REQUIREMENTS

1. To provide renewable energy at these conditions:
  - (a) Low rise (3 storeys and below)
    - 1 point – 20% of building energy consumption or 1 kWp (whichever is higher)
    - 2 point – 40% of building energy consumption or 2 kWp (whichever is higher)
    - 3 point – 60% of building energy consumption or 3 kWp (whichever is higher)
    - 4 point – 80% of building energy consumption or 4 kWp (whichever is higher)
    - 5 point – 100% of building energy consumption or 5 kWp (whichever is higher)
    - 6 point – 120% of building energy consumption or 6 kWp (whichever is higher)
  - (b) High rise (Above 3 storeys)
    - 1 point – 10% of building energy consumption or 5 kWp (whichever is higher)
    - 2 point – 20% of building energy consumption or 10 kWp (whichever is higher)
    - 3 point – 30% of building energy consumption or 15 kWp (whichever is higher)
    - 4 point – 40% of building energy consumption or 20 kWp (whichever is higher)
    - 5 point – 50% of building energy consumption or 25 kWp (whichever is higher)
    - 6 point – 60% of building energy consumption or 30 kWp (whichever is higher)

## APPROACH &amp; IMPLEMENTATION

Assess the project for renewable energy potential including solar, wind, geothermal, low-impact hydro, biomass and other similar technologies. Building Integrated PhotoVoltaic (BIPV) is highly recommended be used to generate renewable electricity in residential building in Malaysia climate. The BIPV system can be grid integrated or stand-alone system with battery pack to store excess energy production. Solar hot water system may also be used to generate hot water for residential homes, the electrical energy offset by the solar hot water system will be considered as renewable energy.

## REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Plan and elevations marking out areas used by renewable energy equipment. Recommended scale 1: 200.
2. Technology to be used. Total areas of renewable energy equipment, total kWp and predicted annual generation in kWh.
3. Predicted total electricity consumption by the building.
4. Percentage of renewable energy over total electricity consumption.

## REQUIRED SUBMISSION FOR COMPLETION &amp; VERIFICATION ASSESSMENT (CVA)

1. As built Plan and elevations marking out area used by the renewable energy equipment. Recommended scale 1: 200.
2. Photograph of completed installation.
3. Manufacturer issued specification on the renewable energy equipment.
4. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT



## PART 2 | RESIDENTIAL | ENERGY EFFICIENCY (EE)

EE3

ADVANCED EE PERFORMANCE

12 POINTS

**INTENT**

To encourage enhancement to building to provide a thermally comfortable environment to reduce the use of air-conditioning in residential building, thereby reducing CO<sub>2</sub> emission.

**REQUIREMENTS**

Design the residential building to meet these conditions to obtain credits.

- 2 points  
OTTV < 46 W/m<sup>2</sup>  
Lightweight Roof U-value < 0.35 W/m<sup>2</sup>K  
Heavyweight Roof U-value < 0.5 W/m<sup>2</sup>K
- 4 points  
OTTV < 44 W/m<sup>2</sup>  
Lightweight Roof U-value < 0.30 W/m<sup>2</sup>K  
Heavyweight Roof U-value < 0.4 W/m<sup>2</sup>K
- 8 points  
OTTV < 42 W/m<sup>2</sup>  
Lightweight Roof U-value < 0.25 W/m<sup>2</sup>K  
Heavyweight Roof U-value < 0.3 W/m<sup>2</sup>K
- 10 points  
OTTV < 40 W/m<sup>2</sup>  
Lightweight Roof U-value < 0.2 W/m<sup>2</sup>K  
Heavyweight Roof U-value < 0.2 W/m<sup>2</sup>K
- 12 points  
OTTV < 38 W/m<sup>2</sup>  
Lightweight Roof U-value < 0.15 W/m<sup>2</sup>K  
Heavyweight Roof U-value < 0.15 W/m<sup>2</sup>K

**APPROACH & IMPLEMENTATION**

Wall insulation can be made using autoclaved lightweight concretes, composite insulated walls, double brickwall and many other option. Glazing should be optimally sized and the use of performance glazing such as low-e and/or spectrally selective glazing is encouraged. Roof should be insulated with suitable insulation materials to prevent heat gain into occupied spaces.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Plan and elevations marking out wall & apertures used for the calculation coloured blue and walls & apertures not used for calculation coloured red. Recommended scale 1: 200.
2. Calculations for each facing wall.
3. Description of wall & aperture materials specified.
4. Calculations of U-values for roof and walls.
5. Proposed Glazing specifications on Shading Coefficient, U-value and visible light transmission.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built Plan and elevations marking out wall & apertures used for the calculation coloured blue and walls & apertures not used for calculation coloured red. Recommended scale 1: 200.
2. Calculations for each facing wall.
3. Description of built wall & aperture materials with U-value calculation.
4. Manufacturer issued glazing specification on shading coefficient, U-values and visible light transmission.
5. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 2 | RESIDENTIAL | ENERGY EFFICIENCY (EE)

<b>EE4</b>	<b>HOME OFFICE/ACCOMMODATION CLOSE TO WORK PLACE/WORK FROM HOME</b>	<b>2 POINTS</b>
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**INTENT**

To encourage dual use spaces and working from home, thereby discouraging commuting and reducing CO2 emission.

**REQUIREMENTS**

1. Multiple use type developments, **OR**
2. High Speed Internet access available at homes > 1MB/s.

**APPROACH & IMPLEMENTATION**

Design residential homes with spaces for home-office. Or provide high speed internet connection to homes.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Provide plan layout marking out spaces for home-office use. Recommended scale 1: 200, **OR**
2. Provide letter of support from Internet Service Provider.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built Plan marking out spaces for home-office use. Recommended scale 1:200, **OR**
2. Official documentation from Internet Service Provider providing a minimum of 1 MB/s connection to the buildings.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 2 | RESIDENTIAL | ENERGY EFFICIENCY (EE)

**EE5****SUSTAINABLE MAINTENANCE****2 POINTS****INTENT**

Ensure the building's energy related systems will continue to perform as intended beyond the 12 months Defects & Liability Period.

**REQUIREMENTS**

1. One (1) point : Awarded where at least 50% of permanent building maintenance team is on-board one (1) to three (3) months before practical completion and fully participate (to be specified in contract conditions) in the Testing & Commissioning of all building energy related systems.
2. Two (2) Points : Awarded for providing a designated building maintenance office that is fully equipped with facilities (including tools and instrumentation) and inventory storage **AND**

Provision of evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget (inclusive of staffing and outsourced contracts).

**APPROACH & IMPLEMENTATION**

Ensure the maintenance team fully participates in the testing and commissioning stage, understand the design intent and provide a 3 year sustainable maintenance program.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Identify building maintenance room and facilities in the design floor plans.
2. Commitment to engage at least 50% of permanent building maintenance team before practical completion with proposed positions identified.
3. Commitment to provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget (inclusive of staffing and outsourced contracts).

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Documentary evidence of engagement of 50% of the maintenance team one to three months before practical completion who are then involved in the full testing & commissioning of the building energy related systems.
2. Comprehensive list of maintenance tools and instrumentation, and inventory storage items including photographic evidence.
3. Provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget for facility maintenance (inclusive of staffing and outsourced contracts).
4. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 2 | RESIDENTIAL | WATER EFFICIENCY (WE)**

**WE**  
**WATER EFFICIENCY**

**PART 2 | RESIDENTIAL | WATER EFFICIENCY (WE)****WE1****RAINWATER HARVESTING****4 POINTS****INTENT**

To encourage rainwater harvesting that will lead to reduction in potable water consumption.

**DESCRIPTION**

Maximise rainwater collection from rooftop or runoff rainwater systems for residential consumption and/or irrigation.

**REQUIREMENTS**

1. To achieve the following percentage in reduction of potable water consumption.
2. Up to 2 points are awarded as follows:
  - 1 point for 10% or more reduction
  - 2 points for 30% or more reduction
  - 3 points for 40% or more reduction
  - 4 points for 50% or more reduction
3. To submit calculation to demonstrate the reduction in water consumption compared to the building base condition.

**APPROACH & IMPLEMENTATION**

Two main approaches to rainwater harvesting namely collection of runoff rainwater from surrounding site or roof top rainwater harvesting. Both systems requires separate water storage tanks and additional pressure boosting equipment may be required. Gravity feed system is encouraged to avoid additional energy use. Water purifying systems may be necessary depending on the application and methodology of harvesting the rainwater.

**POTENTIAL TECHNOLOGIES & STRATEGIES**

1. Points given for rainwater harvesting that leads to reduction in potable water consumption.
2. To use rainwater for non-potable applications such as toilets and urinal flushing, landscape irrigation, washing clothes etc.
3. Where rainwater filtration/purification is required, use of ozone or activated oxygen in lieu of chlorine or other GHG chemicals, is preferred to obviate negative environmental impact.
4. Reference to GoM's National Urbanization Policy guide on rainwater harvesting for factories, schools & bungalows.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As Built calculations of rainwater harvesting, storage tank capacity and building usage distribution system.
2. Final drawings for rainwater harvesting system and storage tank location (Recommended scale 1:200).

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 2 | RESIDENTIAL | WATER EFFICIENCY (WE)****WE2****WASTE WATER RECYCLING****2 POINTS****INTENT**

To encourage water recycling that will lead to reduction in potable water consumption.

**DESCRIPTION**

1. To encourage recycling of greywater or blackwater for residential and irrigation use to reduce discharge to external sewer, thereby reducing the overall building potable water consumption.
2. To encourage and recognise residential design that reduces water flows to sewerage treatment plants.

**REQUIREMENTS**

1. Up to 2 points are awarded as follows:
  - 1 point for 5% or more wastewater being treated and recycled
  - 2 points for 10% or more wastewater being treated and recycled
  - 3 points for 20% or more wastewater being treated and recycled
  - 4 points for 30% or more wastewater being treated and recycled
2. To submit calculation to demonstrate the percentage of wastewater treated and recycled.

**APPROACH & IMPLEMENTATION**

1. Water treatment systems and re-use technology options are used in treating greywater and blackwater.
2. The treated water is then recycled for use in irrigation, toilet flushing etc.
3. Sand filters can be a cost effective treatment technique.

**POTENTIAL TECHNOLOGIES & STRATEGIES**

1. Consider channelling greywater from sinks, showers and other sources to wastewater treatment plant.
2. Options for on-site wastewater treatment include packaged biological nutrient removal systems and high efficiency filtration systems

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Listing of each type of graywater-generating fixture and frequency of use to determine the amount of discharge generated.
2. A technical report describing the concept and details of treatment plant, conveyance system storage facility and distribution system.
3. The technical report shall include detail schematics showing how the wastewater is collected, channelled, stored and utilised.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As Built calculations of wastewater collection, storage tank capacity and building usage distribution system.
2. Final drawings for wastewater treatment system and storage tank location (Recommended scale 1:200).

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 2 | RESIDENTIAL | WATER EFFICIENCY (WE)****WE3****WATER EFFICIENT LANDSCAPING****2 POINTS****INTENT**

To encourage and recognise the design of landscaping system that minimises or does not require the use of potable water supply from the local water authority.

**DESCRIPTION**

The main aim is to reduce the consumption of potable water for landscape irrigation. This may be achieved through the use of native or adaptive plants to reduce potable water consumption.

**REQUIREMENTS**

Up to 2 points are awarded as follows;

1. 1 point given for reducing potable water consumption for landscape irrigation by 50% or more.
2. 2 points for not using potable water at all for landscape irrigation.

**APPROACH & IMPLEMENTATION**

1. To design a water-efficient landscape by selecting native or adaptive plants that require minimal water.
2. Do not use potable water for landscape irrigation system.

**POTENTIAL TECHNOLOGIES & STRATEGIES**

Perform a soil / climate analysis to determine appropriate plant material and design the landscape with native or adaptive plants to reduce or eliminate irrigation requirements. Where irrigation is required, use high efficiency equipment and/or climate based controllers.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. A brief description of the system with reference(s) to the guidelines used, calculations, and an explanation of how the system meets the requirement for the credit.
2. A short report by a landscape architect detailing the water efficient irrigation system and demonstrating that it will meet all the requirements of the criteria.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built plan of the entire site showing the use of each area and clearly indication the location (or lack of) any landscaped area. Recommended 1:200.
2. As built plan showing the location and design of the recycled water / rainwater system.
3. Recommended scale 1:200.
4. Calculation for the proportion of wastewater being re-use and clearly documented.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 2 | RESIDENTIAL | WATER EFFICIENCY (WE)****WE4****WATER EFFICIENT FITTINGS****4 POINTS****INTENT**

To encourage reduction in potable water consumption through use of efficient devices.

**REQUIREMENT**

1. Up to 4 points are awarded as follows:
  - 1 point for reduction of 10% or more annual potable water consumption
  - 2 points for reduction of 30% or more annual potable water consumption
  - 4 points for reduction of 50% or more annual potable water consumption
2. To submit calculation to demonstrate that the fittings selected will reduce the potable water consumption compared to the building base conditions.

**APPROACH & IMPLEMENTATION**

1. The use of water efficient water closets, wash hand basins or shower heads or systems which has the potential to reduce potable water consumption in the residential area.
2. Specify the use of automatic self-closing faucets, electronic or otherwise, to eliminate wastage through faucets carelessly left running.
3. Specify the use of waterless urinals.

**POTENTIAL TECHNOLOGIES & STRATEGIES**

Use high efficiency fixtures, including water efficient water closets, water urinals, showerheads and faucets.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Listing of each type of consuming fixture, flows and frequency of use to determine the amount of potable water usage for base condition.
2. Listing similar to the above but based on water efficient fittings selected.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

Inventory of all water efficient fittings incorporated.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT



**PART 2 | RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)**

**EQ**  
**INDOOR ENVIRONMENTAL  
QUALITY**

## PART 2 | RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)

**EQ1****MINIMUM VENTILATION RATE****2 POINTS****INTENT**

Establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in building, thus contributing to the comfort and well-being of the occupants.

**DESCRIPTION**

To ensure that adequate fresh air supplied to occupied spaces to maintain good air quality in building.

**REQUIREMENTS**

1. Provide the minimum requirements of ventilation rate as per local building code (1 point).
2. Provide natural cross-ventilation or stack ventilation for all public and circulation spaces (2 points).

**APPROACH & IMPLEMENTATION**

Provide adequate openings as required by the local building code. Cross ventilation is obtainable by having opening in both sides of the room. Stack ventilation is obtainable by having low opening and high openings for the same space.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Description of the project ventilation design
2. Schematic to illustrate the project ventilation system design
3. Summary table to show calculations that meet the local building code.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built drawings to illustrate the project ventilation system design.
2. Summary report to describe the ventilation design and how it has complied to local code including information regarding the cross or stack ventilation design and any special conditions that affected the project ventilation design.
3. Calculations to show that the openings provided meets the local code.
4. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 2 | RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)

**EQ2****DAYLIGHTING****2 POINTS****INTENT**

To encourage provision of daylighting in buildings.

**DESCRIPTION**

To design and implement good level of daylight in buildings.

**REQUIREMENTS**

1. Demonstrate that  $\geq 30\%$  of the habitable rooms has a daylight factor in the range of 1.0 – 3.5% as measured at floor level (1 point), **OR**
2. Demonstrate that  $\geq 50\%$  of the habitable rooms has a daylight factor in the range of 1.0 – 3.5% as measured at floor level (2 points), **OR**
3. Demonstrate that  $\geq 75\%$  of the habitable rooms has a daylight factor in the range of 1.0 – 3.5% as measured at floor level (3 points).

**APPROACH & IMPLEMENTATION**

Daylight systems for buildings include window, façade shading/light deflecting devices (e.g. lightshelves), roof lights and atrium spaces. The daylight factor is the ratio of indoor light level measured on the working plane to the outdoor light level during overcast conditions with no direct sun. For a daylighted space, the lighting level should be fairly uniform with no great contrast for visual comfort.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Summary report of the design strategies that will be undertaken to meet the credit requirements.
2. Site plan with height of surrounding buildings indicated.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built drawings and specifications to demonstrate that the daylighting system has been constructed according to design drawings/specifications.
2. Typical floor plans with daylight factor simulation/calculation/measured results.
3. Site plan with height of existing buildings or planned buildings surrounding the building to be indicated.
4. Summary of daylight factor results.
5. Manufacturer Information on the daylighting system used.
6. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 2 | RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ3

## PARTY WALL SOUND INSULATION LEVELS

2 POINTS

**INTENT**

Reduce noise pollution between spaces.

**DESCRIPTION**

To ensure that the building walls and floors system is designed with adequate noise absorption properties to maintain good acoustical quality for the neighbourhood.

**REQUIREMENTS**

Ensure that the air borne sound penetration between spaces are controlled within the following criteria;

1. Inter dwelling sound penetration between dwelling units does not exceed <45 dBAeq. 120 mm thick brick walls with cement render on both sides to weight of 245 kg/m<sup>2</sup> will be deemed to have air borne sound reduction value of 45 dBAeq (1 point).  
Refer tables and sample calculations for other party wall types.
2. Intra dwelling air borne sound penetration between walls in the same dwelling unit should not exceed the following values (1 point).
  - Bedroom < 40 dBAeq
  - Other areas < 30 dBAeq

**APPROACH & IMPLEMENTATION**

Provide party walls with heavy mass or sound insulation materials to reduce transmission of noise between walls. Consider floor underlayments for floors above, to separate the floor's surface above from the ceiling down below. The separation point will serve to disconnect the rooms, decoupling the foot noise and other impact sounds that would otherwise work to vibrate energy through.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. A summary report describing acoustical features to be provided for the building.
2. Typical layout with walls and floors with noise attenuation properties clearly marked. Provide legends to show level of sound attenuation level and computation of sound attenuation level.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built drawings and specifications to demonstrate that the acoustical features has been constructed according to design drawings/specifications.
2. As built acoustic test results.
3. Typical layout with walls and floors with noise attenuation properties clearly marked. Provide legends to show level of sound attenuation level and computation of sound attenuation level.
4. Manufacturer Information on the acoustical system used.
5. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 2 | RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)****EQ4****GOOD QUALITY CONSTRUCTION****1 POINT****INTENT**

To encourage and recognise good quality constructions.

**DESCRIPTION**

To promote good quality constructions to reduce repetitive re-work that waste materials and renovation.

**REQUIREMENTS**

Achieves QLASSIC score  $\geq 70\%$ .

**APPROACH & IMPLEMENTATION**

Refer to QLASSIC documents for details.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Letter of confirmation from building owner to confirm participation in QLASSIC.
2. Letter of support from Architect to confirm standards listed in QLASSIC will be applied to tender and contract specifications.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

QLASSIC certification with score  $> 70\%$ .

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 2 | RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)

**EQ5****VOLATILE ORGANIC COMPOUNDS****1 POINT****INTENT**

To minimize detrimental impact on occupant health through the use of materials with minimal volatile organic compound and formaldehyde content.

**DESCRIPTION**

To encourage the use and specification of healthy materials and finishes which contain low volatile organic compounds and formaldehyde to ensure the well-being of occupants.

**REQUIREMENTS**

1. Use low VOC paint and coating throughout the building. Paints and Coatings to comply with requirements specified in international labelling schemes recognized by GBI, **AND/OR**
2. Use low VOC carpet or flooring throughout the building. Carpets to comply with requirements specified in international labelling schemes recognized by GBI. Other types of flooring to comply with requirements under FloorScore developed by Science Certification System or equivalent, **AND/OR**
3. Use low VOC adhesive and sealant or no adhesive or sealant used. Adhesives and sealants to comply with requirements specified in international labelling schemes recognized by GBI.

**APPROACH & IMPLEMENTATION**

The credit requirements should be clearly stated in project specifications. Indicate what must be provided, e.g. cut-sheets, material safety data sheets, certificates and test reports. Submittal of the compliance documentation should be a pre-requisite for product approval.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Summary report outlining the strategies and procedures to be taken to meet the credit requirements.
2. A copy of the specifications to demonstrate that the procedures will be carried out.
3. Identification of the person responsible for carrying out the work.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built drawings or as built specifications confirming that the building has been constructed in accordance with the design stage drawings/specifications.
2. List of products installed that meet the credit requirements.
3. Manufacturer information including data sheets, certificates, test reports etc to demonstrate credit compliance.
4. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 2 | RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)

**EQ6****FORMALDEHYDE MINIMISATION****1 POINT****INTENT**

Reduce the exposure of occupants to formaldehyde and promote good indoor air quality in the living space.

**DESCRIPTION**

Products with no added urea formaldehyde are to be used.

**REQUIREMENTS**

Use products with no added urea formaldehyde. These include:

1. Composite wood and agrifiber products defined as: particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates and door cores, **AND**
2. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies, **AND**
3. Insulation foam, **AND**
4. Draperies.

**APPROACH & IMPLEMENTATION**

Ensure that that credit requirements are clearly stated in contract tender documents. Submittal of the compliance documentation should be a pre-requisite for product approval.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Summary report outlining the strategies and procedures to be taken to meet the credit requirements.
2. A copy of the specifications to demonstrate that the procedures will be carried out.
3. Identification of the person responsible for carrying out the work.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built drawings or as built specifications confirming that the building has been constructed in accordance with the design stage drawings/specifications.
2. Report to outline the measures undertaken to ensure that credit is met.
3. Manufacturer information to verify credit compliance.
4. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 2 | RESIDENTIAL | INDOOR ENVIRONMENTAL QUALITY (EQ)

**EQ7****POST OCCUPANCY COMFORT SURVEY: VERIFICATION****2 POINTS****INTENT**

To provide verification of the comfort of the occupants in the building.

**DESCRIPTION**

To conduct post occupancy comfort survey of the building occupants and to undertake measures to rectify the problems identified during the survey.

**REQUIREMENTS**

1. Conduct a post-occupancy comfort survey of building occupants within 12 months after occupancy/building completion. This survey should collect anonymous responses about thermal comfort, visual comfort and acoustic comfort in a building. It should include an assessment of overall satisfaction with thermal, visual and acoustic performance and identification of thermal-related, visual-related and acoustic-related problems.
2. Develop a plan for corrective action if the survey results indicate that more than 20% of occupants are dissatisfied with the overall comfort in the building. This plan should include measurement of relevant environmental variables in problem areas. The relevant environmental variables include 1) Temperature, relative humidity, air speed and mean radiant temperature, 2) Lighting level and glare problem, 3) Background noise level, 4) Odour problem, CO<sub>2</sub> level, VOCs, and particulate concentration.

**APPROACH & IMPLEMENTATION**

Provide a systematic process and system for occupants to provide feedback on their indoor environmental comfort. The survey should collect responses from a significant and representative sample of occupants. The subjective survey should be accompanied with objective measurements of the relevant environmental variables. Short term monitoring or spot measurements should be done once problem areas have been identified through the survey. Corrective actions should then be undertaken to rectify the problem areas identified to improve the indoor environmental conditions of the occupants.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. A Summary report of the strategies that will be undertaken to meet the credit compliance.
2. A copy of specifications that demonstrate that this credit will be met after the building is completed, also stating the person responsible for this job.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Survey questionnaire to be used to collect responses from the occupants.
2. Objective measurement plan illustrating the areas and measurements to be undertaken.
3. Analysis report of the results of the survey and measurements.
4. Corrective action plan and measures undertaken to rectify the problem.
5. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT



**PART 2 | RESIDENTIAL | MATERIALS AND RESOURCES (MR)**

**MR**  
**MATERIALS AND RESOURCES**

## PART 2 | RESIDENTIAL | MATERIALS AND RESOURCES (MR)

**MR1****STORAGE & COLLECTION OF RECYCLABLES****2 POINTS****INTENT**

Provide dedicated areas and storage bins for non-hazardous materials for recycling during BOTH construction and building occupancy.

**DESCRIPTION**

Facilitate the reduction of waste generated by construction that is hauled and disposed off in landfills and recycling after occupancy.

**REQUIREMENTS**

1. During Construction, provide dedicated area/s and storage for collection of non-hazardous materials for recycling. (1 point)
2. During Building Occupancy, provide permanent recycling bins. The waste that should be collected at a minimum should include aluminium, paper, plastics, glass, corrugated cardboard and batteries. (1 point)

**APPROACH & IMPLEMENTATION**

During construction, designate a dedicated area where on-site sorted waste materials can be stored in separate skips for collection to recycling facilities. This is tied in with credit MR3: Construction Waste Management.

Designate areas in the building for recycling bins to be located which is accessible and convenient for occupants to recycle their waste. It could be located in one main area or each floor as long it can be demonstrated that the recycling facilities provided is sufficient to cater to the waste volume generated by the occupants.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. A copy of site plan indicating the designated area of storage and collection of construction waste to be recycled.
2. A copy of floor plan showing the location of the storage area for recyclables and its proximity to the building entrance and vehicular access point/s.
3. Ensure that the space provided for recyclables is in addition to the storage allocated for general waste.
4. The drawings should ensure that the vehicular access provides adequate space for manoeuvring and sufficient size for loading bays for vehicles collecting the recyclables.
5. A description of the labelling of recyclables should be also provided.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. A copy of marked as-built drawing plan/s showing the location/s of the storage area for recyclables. The plan should indicate the proximity of the storage from the building entrance and mark where vehicular access is.
2. The drawings should ensure that the vehicular access provides adequate space for manoeuvring and sufficient size for loading bays for vehicles collecting the recyclables.
3. Photographs showing the location, size, the storage provision and labelling of dedicated facilities.
4. Describe any deviation or addition to the DA submission.
5. Description of how the recyclables are to be handled.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 2 | RESIDENTIAL | MATERIALS AND RESOURCES (MR)****MR2****MATERIAL RE-USE AND SELECTION****2 POINTS****INTENT**

Encourage owners to specify the usage of reused building materials in new buildings.

**DESCRIPTION**

Reuse building materials and products to reduce demand for virgin materials and reduce creation of waste. This serves to reduce environmental impact associated with extraction and processing of virgin resources. Integrate building design and its buildability with selection of reused building materials, taking into account their embodied energy, durability, carbon content and life cycle costs.

**REQUIREMENTS**

1. Where reused products/materials constitutes 1% of the project's total material cost value. (0.5 point)
2. 0.25 point for every 0.5% increase up to maximum of 2 points.

**APPROACH & IMPLEMENTATION**

The following approach can achieve this credit by using:

1. Reused Materials found on site
  - Fixed components such as doors, cabinetries, posts etc. that no longer serve their original function are refurbished, reconditioned and installed for a different use or in a different location.
  - Finish materials such as door, windows and cabinet associated hardware that are refurbished and used to its original function.
2. Reused Materials found off site
  - Use of salvaged materials found off site. They must be previously used or they may be relocated from another facility.
3. Temporary structures
  - Temporary formwork, framing and structures etc that can be reused many times before disposal (minimum 15 cycles of usage) can also be included. If the temporary structures are not new procurement to this project and have been used previously in other projects, state the number of uses that are remaining

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. List of reused or salvaged materials used in the project.
2. Cost of each reused or salvaged materials either based on actual cost paid or replacement value of the material.
3. Establish the estimated Total Cost of the materials in the project.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built drawings or as built specifications confirming that the building has been constructed in accordance with the design stage drawings/specifications.
2. List of reused or salvaged materials used in the project after completion and their locations in the building.
3. Cost of each reused or salvaged materials either based on actual cost paid or replacement value of the material.
4. Provide the Actual Total Cost of the materials in the project.
5. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 2 | RESIDENTIAL | MATERIALS AND RESOURCES (MR)****MR3****CONSTRUCTION WASTE  
MANAGEMENT****2 POINTS****INTENT**

Reduce and recycle construction waste materials and divert from disposal to landfills.

**DESCRIPTION**

Develop and implement a construction waste management plan that, as a minimum identifies the materials to be diverted from disposal regardless of whether the materials will be sorted on site or co-mingled. Quantify by measuring total truck loads of waste sent for disposal.

**REQUIREMENTS**

1. Recycle and/or salvage > 50% volume of non-hazardous construction debris (1 point)
2. 0.25 point for every additional 5% up to a maximum of 2 points.

**APPROACH & IMPLEMENTATION**

1. A waste management plan must be developed and types of non-hazardous construction waste identified. Excavated soil must be excluded in the calculation.
2. Identify construction haulers and recyclers to handle the designated construction waste and ensure that records are kept to verify that the materials diverted have been recycled or salvaged as intended.
3. Use of pre-cast reduces waste produced on site.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. To calculate the percentage, convert all waste materials to either weight (tons) or volume (cubic meter).
2. For comingled recycled wastes, summaries of diversion rates is required from the recyclers.
3. Provide a table with a list of diverted/recycled/landfill waste and the quantity of the diverted/recycled/landfill waste.
4. A copy of the specification clause that requires the main/principal contractor to produce the required waste management plan and waste audit.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. To calculate the percentage, convert all waste materials to either weight or volume.
2. For comingled recycled wastes, summaries of diversion rates is required from the recyclers.
3. A copy of the construction waste management plan from the main/principal contractor and a table with a list of diverted/recycled waste/landfill waste, diverted/recycled/landfill waste destination or location and the quantity of the diverted/recycled/landfill waste.
4. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 2 | RESIDENTIAL | MATERIALS AND RESOURCES (MR)

**MR4****RECYCLED CONTENT MATERIALS****2 POINTS****INTENT**

Encourage designers to specify the usage of recycled content materials in new buildings.

**DESCRIPTION**

Increase demand for building products that incorporate recycled content materials in their production:- (Recycled content shall be defined in accordance with the International Organization of Standards Document).

**REQUIREMENTS**

1. Where use of materials with recycled content is such that the sum of post-consumer recycled plus one-half of the pre-consumer content constitutes > 10% (based on cost) of the total value of the materials in the project (1 point)
2. 0.25 point for every additional 5% increase up to a maximum of 2 points.

**APPROACH & IMPLEMENTATION**

The goal in using materials with recycled content should be established during the design phase. The project team must identify materials with recycled content and such availability should be coordinated by the project team with the contractor, subcontractors and suppliers.

The amounts and values of the recycled content of the materials to the total material cost must be documented by the project team.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. List all recycled content materials and products and their costs.
2. The percentage of post-consumer and/or pre-consumer recycled content must be established by weight.
3. Information on the sources/suppliers on the materials with recycled content must be provided.
4. Calculation on the recycled content value of each material must be provided.
5. Calculate the total percentage (based on cost) value of the materials with recycled content of the estimated total value of the materials in the project.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built drawings or as built specifications confirming that the building has been constructed in accordance with the design stage drawings/specifications.
2. List all recycled content materials and products and their costs used in the project after completion.
3. The percentage of post-consumer and/or pre-consumer recycled content must be established by weight.
4. Information on the sources/suppliers on the materials with recycled content must be provided.
5. Calculation on the recycled content value of each material must be provided.
6. Calculate the total percentage (based on cost) value of the materials with recycled content of the actual total value of the materials in the project.
7. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 2 | RESIDENTIAL | MATERIALS AND RESOURCES (MR)

**MR5****REGIONAL MATERIALS****1 POINT****INTENT**

Encourage sourcing of regional materials to reduce environmental impacts due to transportation.

**DESCRIPTION**

Use building materials and products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

**REQUIREMENTS**

1. Use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500km (radius) of the project site for > 20% (based on cost) of the total material value. Mechanical, electrical and plumbing components shall not be included. Only include materials permanently installed in the project. (0.5 point)
2. 0.25 point for every additional 5% up to a maximum of 1 point.

**APPROACH & IMPLEMENTATION**

This credit must be evaluated early in the design process as materials and products that can be sourced locally can be established. The general contractor must work with subcontractors and suppliers to verify the availability of materials which are extracted/harvested/recovered and manufactured locally. This will ensure that the project team is aware on the availability of such materials and give focus on the materials that will contribute the most to this credit.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. List of products that are extracted/harvested/recovered and manufactured within 500 km. of the project site.
2. Provide the following:
  - Name of the manufacturer
  - Product cost
  - The distance between the project site and the manufacturer
  - The distance between the project site and the extraction site for each raw material contained within each product
3. Determine the Total Material Cost
4. Calculate the percent local materials = Total Cost of Local Materials (RM)/Total Material Cost (RM)

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built drawings or as built specifications confirming that the building has been constructed in accordance with the design stage drawings/specifications.
2. List of products that are extracted/harvested/recovered and manufactured within 500 km. of the project site after completion.
3. Provide the following:
  - Name of the manufacturer
  - Product cost
  - The distance between the project site and the manufacturer
  - The distance between the project site and the extraction site for each raw material contained within each product.
4. Determine the Actual Total Material Cost.
5. Calculation on the recycled content value of each material must be provided.
6. Calculate the percent local materials = Total Cost of Local Materials (RM)/Actual Total Material Cost (RM).
7. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## PART 2 | RESIDENTIAL | MATERIALS AND RESOURCES (MR)

**MR6****CERTIFIED WOOD****1 POINT****INTENT**

Promote responsible forest management taking the interest of indigeneous people into account.

**DESCRIPTION**

Encourage environmentally responsible forest management.

**REQUIREMENTS**

1. Where > 50% of wood-based materials and products used are certified. These components include, but are not limited to, structural framing and general dimensional framing, flooring, sub-flooring, wood doors and finishes. To include wood materials permanently installed and also temporarily purchased for the project. Compliance with Forest Stewardship Council requirements or equivalent. (0.5 point)
2. 0.5 point for 50% and 0.25point for every additional 10% up to maximum of 1 point.

**APPROACH & IMPLEMENTATION**

Establish the volume and types of use of the wood products in the project. Check the availability of the wood species and products that complies with the Forest Stewardship Council (FSC) requirements or equivalent by making contact with the local vendors, suppliers and manufacturers that provide FSC certified or equivalent products.

Provide a list of certified vendors, suppliers and manufacturers to the contract bidders that they will establish availability of the wood products specified in the project.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. List all new wood products specified in the project and identify which components are at least FSC certified or equivalent.
2. Provide a list of vendors/suppliers capable of providing FSC certified wood products or equivalent for the project.
3. The FSC certified wood must be identified as "FSC Pure", "FSC Mixed" or "FSC Mixed (NN)".
4. The volume of each wood products must be shown.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built drawings or as built specifications confirming that the building has been constructed in accordance with the design stage drawings/specifications.
2. List all new wood products specified in the project and identify which components are at least FSC certified.
3. The MTCC certified wood must be identified as "FSC Pure", "FSC Mixed" or "FSC Mixed (NN)".
4. The volume of each wood products must be shown.
5. The vendor's chain-of-custody (COC) number must be shown in the invoice that includes FSC products.
6. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

PART 2 | RESIDENTIAL | INNOVATION (IN)

**IN**  
**INNOVATION**



## PART 2 | RESIDENTIAL | INNOVATION (IN)

**IN1****INNOVATION IN DESIGN &  
ENVIRONMENTAL DESIGN INITIATIVES****5 POINTS****INTENT**

Provide design team and project the opportunity to be awarded points for exceptional performance above the requirements set by GBI rating system.

**DESCRIPTION**

Reward innovation and initiatives.

**REQUIREMENTS**

Encourage design team and project the opportunity to be score points for exceptional performance above the requirements set by GBI rating system:

1 point for each approved innovation and environmental design initiative up to a maximum of 5 points, for innovative ideas such as, but not limited to :

1. Condensate water recovery (accounting for at least 50% of total AHUs/FCUs) for use as cooling tower make-up water etc;
2. Co-generation / Tri-generation system;
3. Thermal / PCM / Thermal Mass storage system (accounting for at least 25% of total required capacity);
4. Solar thermal technology / Solar Airconditioners (generating at least 10% of total required capacity);
5. Heat recovery system (contributing to at least 10% of total required capacity);
6. Heat pipe technology ( contributing to at least 75% of relevant applications)
7. Light pipes ( generating at least 1% of the total lighting capacity);
8. Auto-condenser tube cleaning system (fitted to plant equipment serving at least 50% of total capacity);
9. Non-chemical water treatment system (serving at least 50% of total capacity);
10. Mixed mode / low energy ventilation system;
11. Advanced air filtration technology (serving at least 50% of the NLA);
12. Waterless urinals (fitted to all male toilets);
13. Central vacuum system (serving at least 50% of NLA);
14. Central Pneumatic Waste Collection system;
15. Self-cleaning façade;
16. Electrochromic glazed façade;
17. Refrigerant leakage detection and recycling facilities ( catering for the whole main plant)
18. Recycling of all fire system water during regular testing;

Project team may submit any innovation not listed above to GBI for consideration and approval of credit.

**APPROACH & IMPLEMENTATION**

During Concept Design Stage, commence discussions on all possible innovation ideas to be incorporated into the building early. Late incorporation of innovation ideas may be difficult and costly.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

Report on each innovation, how it is derived, and how it would assist in reducing energy and improving sustainable design.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Full documentation and photographic evidence of each innovation, and the process from commencement to commissioning, complete with drawings, manuals and maintenance write-up.
2. Describe any deviation or addition to the DA submission.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

**PART 2 | RESIDENTIAL | INNOVATION (IN)****IN2****GREEN BUILDING INDEX  
FACILITATOR****1 POINT****INTENT**

To support and encourage the design integration required for Green Building Index rated buildings and to streamline the application and certification process.

**DESCRIPTION**

Encourage and promote green technology service providers.

**REQUIREMENTS**

Support and encourage the design integration required for Green Building Index rated buildings and to streamline the application and certification, where:

At least one principal participant of the project team shall be a Green Building Index Facilitator who is engaged at the onset of the design process until completion of construction and Green Building Index certification is obtained. Name of GBI Facilitator shall be inserted in GBI Application & Registration Form.

**APPROACH & IMPLEMENTATION**

Appoint a Green Building Index Facilitator early to assist in the concept design stage, and ensure that the Facilitator follows through the entire project.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Proof of appointment of named GBI Facilitator .
2. GBI Facilitator to present DA submission to GBI Certifier.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. GBI Facilitator to present CVA submission to GBI Certifier.

**NOTE** ALL DOCUMENTATION TO BE SIGNED BY SUBMITTING PERSON WITH CLIENT ENDORSEMENT

## ACKNOWLEDGEMENTS

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